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USSR Report

SCIENCE AND TECHNOLOGY POLICY

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ORGANIZATION, PLANNING AND COORDINATION

INTEGRATION OF SCIENCE, PRODUCTION IN TERRITORIAL COMPLEXES

Alma-Ata NARODNOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 12, Dec 85 pp 29-32

[Article by A. Alimbayev, Kh. Kabzhanov, and A. Kravtsov: "Seek Effective Forms of the Integration of Science With Production"]

[Text] Under the conditions of the acceleration of the socioeconomic development of the country a large number of economic and social problems can be solved significantly more rapidly and effectively within the territorial production complex. Precisely in the largest regions the opportunity exists to introduce scientific and technical measures rapidly and to distribute and use productive forces efficiently.

It is a question not only of the improvement of the organizational structure of management organs, but also of the solution of the constantly arising problems of a territorial and sectorial nature and the assurance of the unconditional priority of national interests.

The role of regional management does not reduce only to the management of production. Its basic task is the assurance of the unity of the economic and social development of the region.

Whereas previously when integrating science and production primarily problems of a relatively special nature, which were connected with the increase of the efficiency of the work of individual enterprises, production associations, or the sector as a whole, were posed, with the formation of territorial production complexes the problems of the integrated influence on large natural objects and vast regional territories are being posed. Thus, scientific and technical progress under these conditions is expanding the zone of its effect and influence. This, in turn, is objectively posing the problem of creating a flexible system of management, which ensures the balance of the functioning of the economy of the region.

As is known, the territorial production complex is formed on the basis of large economic regions. Its components (various national economic objects) are closely interconnected on the basis of common local natural and economic conditions.

The formation and functioning of the territorial production complex are prepared directly by the development of scientific and technical progress and the implementation of its end results, since it is possible to obtain the desired results in the matter of the comprehensive development and the increase of the efficiency of the work of all the enterprises belonging to the territorial production complex only by relying on the latest equipment and technology.

For the present the integration of science and production for the most part has a sectorial orientation, which in most cases serves as the basis for the establishment of scientific production associations and other formations.

The territorial unity of all the participants in the "science--production" chain, which belong to one sector or one ministry, was a prerequisite for the establishment of many scientific production complexes. However, not all of them had within them units of the "research--production" cycle. As a result a situation is being created, in which within the region the systematic development of the scientific and technical potential of the sectors represented in it is being upset. This, in turn, is having the result that the development of the region as a whole is being carried out not comprehensively and, hence, not efficiently enough. Such a situation is being aggravated by the effect of a number of subjective factors.

The sectorial specialization of scientific research and development, which does not take adequately into account regional specialization and intersectorial cooperation, leads to departmental isolation and to work only for "one's own" enterprises, proper attention is not directed to the needs and demands of others, the development of related sectors, which are in territorial proximity, is checked. Moreover, "technical growth is being hindered due to a narrow departmental approach and the habit, which has become ingrained in a number of cases, of dismissing 'others',' although unquestionably valuable innovations." (Footnote 1) (PRAVDA, 30 January 1985)

Thus, the departmental "monopolization" of scientific and technical progress is to a certain degree a hindrance to the comprehensive intersectorial use of its achievements.

We are not advocates of the establishment of scientific production complexes in all sectors which could be represented within the territorial production complex. Why?

First, there is not always a scientific production and economic need for this; second, it can lead to the excessive increase of the number of scientists and, moreover, to the duplication of research and development.

Meanwhile at present many ministries and departments are stubbornly striving for the increase of the number of scientists at subordinate organizations, while showing little concern for the comprehensiveness and systematicness of the technical development of production at the enterprises which are located within a single territorial production complex.

The lack of the comprehensive interdepartmental use of sectorial science obviously leads to the decrease of the efficiency of many scientific research institutes and design bureaus and their quality of work and, hence, as a whole also to the decrease of the efficiency of scientific and technical progress, which takes into account the interests of both individual sectors and the specific territory as a whole.

Consequently, the establishment of scientific production associations can no longer be the only form of the organizational convergence of science with production. This is also confirmed by the fact that the increase of the level of the intensification of the territorial production complex not only is in limited dependence on the use of the achievements of science and technology in one of the numerous sectors represented in the complex, which at times are of the nature of individual isolated measures, but is also governed first of all by the degree of the comprehensive interdepartmental use of the achievements of scientific and technical progress by all the represented sectors of the given region. Moreover, the consideration of the entire set of components of the development of science and technology, which follows from the common fundamental tasks, which face the national economy of the region as a whole and take into account the optimum use of the particular specific factors which are characteristic of the given region, is important.

Of course, under such conditions the search for efficient forms of the integration of science with production within the territorial production complex is an extremely difficult problem on the scientific and practical level. The great dynamicness of the management of the different units, which are included in the structure of the territorial production complex, is required. Moreover, under the conditions of the territorial management of scientific and technical progress the participation of the broad masses of workers in the assurance of a rapid pace of the introduction of the achievements of science and technology is necessary, the task of eliminating departmental barriers when determining the technical policy of the territorial industrial complex arises. However, it is impossible to achieve this without the elaboration by interdepartmental territorial organs of management of more effective measures on the stimulation of the fulfillment of the plans of new equipment and without a flexible system of the consideration of the degree of the intersectorial integration of science and production with allowance made for the specific conditions of the development of the territorial production complex. While, in turn, it is impossible to solve these problems without effective tools of the forecasting of the socioeconomic consequences of scientific and technical progress.

At present no sector is capable of having even for itself an entire "set" of scientific and planning organizations, which could ensure the progress of an entire sector or association (enterprise), not to mention the supply of documents to a number of sectors, which are in territorial proximity, as occurs in the territorial production complex. Consequently, the establishment of the intersectorial and interdepartmental cooperation of scientific organizations and planning and design organizations is justified.

Under such conditions it is possible to perform competently and consistently in a planned manner comprehensive scientific research work along the entire

front of the development of intersectorial science and technology. This assumption follows from the objective need for the proportionate development of the complex. The establishment of such an organization is especially important as the structure of sectorial science in fact does not coincide with the sectorial structure of the territorial production complex.

The comprehensive approach should be the main thing in the methodology of the formation of the interdepartmental and intersectorial organization for the development and introduction of the achievements of science and technology within a functioning territorial production complex. This implies the need for the establishment of such an economic mechanism of the integration of science and production within the territorial production complex, which would ensure the meeting of the economic interests of the integrated scientific research and planning and design organizations, on the one hand, and those who use the ideas, new equipment, and technology, on the other.

At the June conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress General Secretary of the CPSU Central Committee Comrade M.S. Gorbachev noted: "We should look at the tasks of science through the prism of the requirements of the times--the requirements of its decisive turn toward the needs of social production, and of production toward science. All the links of the chain, which unite science, technology, and production, should be analyzed and strengthened from this standpoint."

The comprehensiveness of the implementation of the achievements of science and technology to a certain degree can also be governed by the active participation of the given territorial region in socialist scientific and technical integration.

When developing the forms of the integration of science and production within the territorial production complex, it is necessary, in our opinion, to direct particular attention to the conformity of the work of regional and departmental scientific research institutes, design bureaus, and planning and design bureaus to the posed tasks. This will contribute to the elimination of intersectorial barriers when introducing the achievements of scientific and technical progress in the territorial production complex and will speed up the "research--production" cycle.

It should be noted that we are not disclaiming the established forms of the integration of science with production, particularly scientific production associations, which have demonstrated their necessity and efficiency. However, when it is a question of a qualitatively new form of the development of the integration of science with production and the improvement of the components of a functioning territorial production complex, which is represented on the territory of the region by various sectors, many of which have a rapidly changing assortment of products and a high science intensity, scientific production associations inadequately meet the tasks of the day.

At present at a number of enterprises and sectors of the national economy complex and expensive equipment, which alone in practice it is not possible to

utilize completely and efficiently, is being purchased for the conducting of more thorough, comprehensive research and experiments.

For the elimination of this shortcoming intersectorial pilot experimental works, testing grounds, and warehouses of research equipment should be established under the aegis of interdepartmental organizations. They could serve on a contractual basis the scientific organizations present within the territorial production complex, regardless of their subordination. The renting of scientific research equipment by interested organizations, undoubtedly, would make it possible to increase the technical equipment of all the sectors represented in the region, including those with a negligible scientific and technical potential.

There is another means of integrating science with production within the territorial production complex. The point is that given the existence of a high level and concentration of the scientific and technical potential in the territorial production complex the need for the establishment of a common coordinating scientific center arises. As an example it is possible to cite the organization in Karaganda of a department of the Kazakh SSR Academy of Sciences.

At present the bureau of the department with the active assistance of the party organs of 8 oblasts of Central and Northern Kazakhstan, where there are about 150 scientific, planning and design, educational, and other organizations, is performing work on the coordination and integration of scientific research in the region.

A coordinating council, which consists of six sections for sectorial sciences, has been established for the purpose of increasing the efficiency of this scientific potential and accelerating the introduction of the proposals of scientists, particularly in Karaganda. Thus, the opportunity will appear to manage scientific and technical progress purposefully and to solve a large number of problems of the long-range development of the multisectorial national economy of the region.

When it is a question of the putting into operation in the region of sectors in a single intersectorial program, which acts as the organizing basis and ensures the interaction of all the participants and the representatives of various departments, there is another solution of the problem.

Member of the Politburo of the CPSU Central Committee and First Secretary of the Kazakhstan CP Central Committee Comrade D.A. Kunayev spoke about the diversity of means of the integration of science and production at a meeting of the republic party and economic aktiv: "It is necessary to settle the questions of the establishment of scientific and technical complexes, engineering centers, and temporary creative collectives for the elaboration of specific problems. It is also necessary to use more actively industrial and agricultural enterprises as base enterprises for the conducting of experimental and pilot production tests." (Footnote 2) (KAZAKHSTANSKAYA PRAVDA, 23 June 1985)

Similar experience already exists in the country. Thus, recently the CPSU Central Committee approved of the experience of the Leningrad Oblast Party Committee, which formulated a territorial sectorial program of the intensification of the economy on the basis of the acceleration of the introduction of scientific and technical achievements in the national economy.

Practical experience has shown that the implementation of comprehensive goal programs affords new opportunities for the creative coordination of research and the concentration of the efforts of scientific organizations of various ministries and departments and leads to the intensification of the comprehensive development of the territory of the region on the basis of the use of new forms of the integration of science and production.

In this connection it is also impossible not to note the experience of implementing the Sibir Regional Program, in which about 60 institutes and design bureaus of the Siberian Department of the USSR Academy of Sciences and more than 350 organizations of 60 ministries and departments took part. Calculations show that each ruble of expenditures here can yield an economic impact of not less than 20 rubles. (Footnote 3) (EKONOMICHESKAYA GAZETA, No 4, 1984, p 8)

In analyzing the available experience of implementing regional programs, which are one of the forms of regional management, it is possible to note the positive results of the work of the Western Scientific Center of the Ukrainian SSR Academy of Sciences on devising and developing one of the most effective forms of the creative cooperation of academic institutes with production--interdepartmental special-purpose scientific production associations (MTsNPO's). Their establishment contributes to the comprehensive planning of the "research--production" cycle and shortens the time of the introduction of developments. One of the conditions of this acceleration is the neutralization of the influence of narrow departmental interests. The development time is shortened by 0.6-0.8 year, while assimilation is accomplished in 1.5-2 years.

The experience of the Western Scientific Center of the Ukrainian SSR Academy of Sciences showed that the organizational factor, which eliminates in good time parallelism and departmentalism in the solution of economic, scientific, and technical problems and organizes efficiently the interrelations of all the participants in the comprehensive goal program, has a substantial influence on the efficiency of interdepartmental special-purpose scientific production associations. Therefore, the method of goal program planning should be used more extensively in the regions.

For each large territorial production complex it is necessary to specify the group of most important scientific and technical problems. In aggregate the stage-by-stage nature of the solution of such problems would provide a long-term program of the development of the given territory with allowance made for the formed economic and scientific potential of the region and the prospects of its development.

Such programs of the development of regions could constitute the basis of the comprehensive program of scientific and technical progress of the country for

the distant future as components of the section "Regional Problems of Scientific and Technical Progress." This would make it possible to reflect more completely in them the peculiarities of the scientific and technical policy, which is planned for implementation on the specific territory, the specific nature, level, and prospects of the development of the productive forces of the region on the basis of the improvement of the forms of the integration of science and production.

Under the conditions of the intensification of the national economy it is necessary to seek relentlessly new, more effective forms of the integration of science with production, to improve them, to develop them, and to use them creatively as applied to local conditions. This complex process inevitably involves the reevaluation of fixed rules and habits and the development of new skills of management and a new attitude toward the problems being solved and the results being achieved.

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LEGAL ASPECTS OF MANAGEMENT OF SCIENTIFIC, TECHNICAL PROGRESS

Moscow KHOZYAYSTVO I PRAVO in Russian No 12, Dec 85 pp 4-8

[Article by Doctor of Economic Sciences V. Pokrovskiy: "The Effectiveness of the Management of Scientific and Technical Progress: Legal Questions"; capitalized passages published in boldface]

[Text] In the draft of the Program of the Communist Party of the Soviet Union (the new version) the cardinal acceleration of scientific and technical progress is advanced as a vital issue of economic strategy. The new technical renovation of the national economy has to be carried out and on this basis the material and technical base of society has to been transformed. A large role here belongs to the improvement of the legal regulation of scientific and technical progress and the increase of the effectiveness of its management.

This implies first of all that the law can and should act not simply as a regulator of the forming relations, but to a significant degree also as a mechanism which forms and organizes them in conformity with the set goal. Meanwhile the practical experience of the work of enterprises, associations, ministries, and departments showed that the legal mechanism is not yet properly influencing the acceleration of scientific and technical progress and the increase of product quality.

The experience of work under the conditions of the economic experiment showed the need for the further improvement of the forms and methods of management. Their introduction requires active work at all levels of economic management. The decree "On the Extensive Dissemination of New Methods of Management and the Strengthening of Their Influence on the Acceleration of Scientific and Technical Progress," which was recently adopted by the CPSU Central Committee and the USSR Council of Ministers, is also aimed at this.

The use of new, more effective forms of planning, cost accounting, economic levers, and pricing requires the further improvement of their legal regulation, especially in the area of the speeding up of the development and use of valuable innovations.

The improvement of the management of scientific and technical progress is connected first of all with the need for the increase of the importance of the unified technical policy, within the framework of which the choice of the most

promising scientific and technical achievements, which govern the efficiency of the functioning of the economy in the future, should be made.

The major structural changes in the national economy as a result of the use of the achievements of science and technology should have as their ultimate goal the increase of the level of productivity and the efficiency of social production. However, the replacement of economic and social goals with purely technical, and at times even accounting and statistical goals frequently occurs (especially in case of long-range planning). For example, they plan, take into account, and monitor the introduction of the number of units of new equipment, but they plan, take into account, and monitor the impact from its use only selectively and separately. As a result, there are more and more units of introduction, while the impact is declining. One introduction yields on the average an impact of not more than 6,000 rubles and does not ensure the freeing of even 1 person. In other words, these are, as a rule, minor measures which do not have a substantial influence on the efficiency of social production as a whole.

Now THE TIGHTENING UP OF THE PROCEDURE OF THE IDENTIFICATION, PREPARATION, ANALYSIS, AND SELECTION OF THE MOST IMPORTANT DIRECTIONS OF SCIENTIFIC AND TECHNICAL PROGRESS IS NECESSARY. The economic and social problems of scientific and technical development were still quite recently regarded as a certain incidental result which forms by itself. True, an attempt at the formulation of the socioeconomic problems of scientific and technical development has already been made several times when drafting versions of the comprehensive program of scientific and technical progress for the long-range future. However, the importance of the majority of conclusions and recommendations of this program was weakened due to the contradictions that remained unresolved and due to the "vagueness" in the distribution of the priorities of the outlined measures of scientific and technical progress.

IT IS ADVISABLE IN ACCORDANCE WITH STANDARD PROCEDURE TO CONFIRM THE PREFERENCE TO THE DEVELOPMENT OF THE SOCIOECONOMICALLY MOST IMPORTANT DIRECTIONS OF SCIENCE AND TECHNOLOGY, AS WELL AS TO THE RAPID INTRODUCTION OF ESPECIALLY IMPORTANT SCIENTIFIC AND TECHNICAL INNOVATIONS WHICH YIELD AN IMPACT IN MANY SECTORS AND SPHERES OF ACTIVITY.

Undoubtedly, the legal norms, which already exist and are connected with the changeover of sectorial scientific research, planning and design, technological, and planning and surveying organizations to the system of payment for completely finished work, are positive. Perhaps, it would be useful to supplement this procedure with the corresponding economic sanctions for the failure to introduce or the untimely introduction of new equipment. In our opinion, IT IS ADVISABLE AT ALL LEVELS OF PLANNING TO CHANGE OVER TO THE LEADING DRAFTING OF THE PLANS OF SCIENTIFIC AND TECHNICAL PROGRESS, IN ORDER ON THEIR BASIS TO FORMULATE THE OTHER SECTIONS OF THE PLAN. Experience already exists. When conducting the economic experiment in the Estonian SSR Ministry of Light Industry the drawing up of the section of the plan "Science and Technology" (in the area of the assimilation of new types of products, the introduction of advanced technology, the mechanization and automation of production processes) 6 months before the examination of the other sections of the plan of the sector was envisaged. This is contributing to the increase of

the role of the plans of the development of science and technology in the overall system of planning. They are turning into the core for the drafting of all the sections of the plans of economic and social development.

At present the planning of the stages of the life cycle of equipment is dispersed at the state level among different departments, while within the sector among the various subdivisions of the ministries. Under such conditions it is necessary to organize planning over the entire life cycle of equipment in connection with the socioeconomic results of its use. If this is not done, many steps being taken on the improvement of the planning of innovations will not yield the anticipated results.

Under the conditions of the more and more extensive use in the economy of cost accounting methods--and such a trend is clearly visible in the national economy--it is necessary to orient the plan indicators toward the end economic results of the use of new equipment. At the June conference in the CPSU Central Committee of questions of the acceleration of scientific and technical progress it was stated that the activity of enterprises and associations should be regulated to a greater and greater extent by economic standards. It is time to establish here legislative order and to establish rigidly a list of the indicators which are approved in the plan.

As is noted in the draft of the new version of the Program of the Communist Party, the utmost increase of the technical level and quality of products will always be at the center of party economic policy. The increase of their quality is a reliable means of the more complete meeting of the needs of the country for the necessary items and the increasing demand of the population for various goods. Experience attests that each ruble, which is invested in the increase of the reliability and quality of equipment, yields an economic impact of 6-10 rubles. (Footnote 1) (See EKONOMICHESKAYA GAZETA, No 15, 1985, p 7) However, there are instances when a product with the Emblem of Quality yields the national economy only losses. The proportion of products of the highest quality category in machine building on 1 June 1985 comes to more than 30 percent. At the same time several thousand skilled installers are diverted annually for the elimination of plant defects and the further assembly of equipment into units. The certification of industrial products was for too long, in essence, a purely departmental institution of the producing sectors.

The establishment of responsibility for the delivery of low-quality products is of great practical importance.

In conformity with Decree No 699 of the CPSU Central Committee and the USSR Council of Ministers of 12 July 1985 the responsibility of production associations (enterprises) for the quality of the products delivered to the client has been increased. Starting in 1986 the expenditures on the correction of defects, which have been detected by the client in the delivered products, are recovered by the decrease of the material incentive fund of the production associations (enterprises) which are the suppliers.

IT IS ADVISABLE TO SUPPLEMENT THE DRAFT OF THE NEW VERSION OF THE CPSU PROGRAM WITH A PROVISION ON THE RESPONSIBILITY FOR THE ASSURANCE OF THE INTRODUCTION OF THE LATEST ACHIEVEMENTS OF SCIENCE AND TECHNOLOGY IN PRODUCTION,

MANAGEMENT, AND THE SERVICE AND CONSUMER SERVICE SPHERE, AS WELL AS FOR THE INCREASE OF THE ECONOMIC RETURN PER RUBLE OF STATE ASSETS WHICH HAVE BEEN SPENT ON SCIENTIFIC RESEARCH AND PLANNING AND DESIGN WORK.

The elimination of intersectorial barriers is of great importance for the acceleration of scientific and technical progress. First of all this concerns the organization of cooperation in the development and production of new equipment. At present too many forces and time are being spent on the coordination of the assignments for the organizations and enterprises, which are taking part in such developments (often there are many tens, at times hundreds of them), and on the assurance of their cooperation. At times even coordinated assignments are not fulfilled or are fulfilled with the violation of the established deadlines.

Departmental barriers also stand in the way of standardization: each sector, and frequently each enterprise (organization) considers it possible to act according to the principle "although it is a little worse, it is our own." The output of items, which are identical in purpose, but are produced by structurally different methods (for example, the motors for Zhiguli and Moskvich passenger cars, which are identical in horsepower and the grade of fuel that is used), does economic harm to the national economy.

The large number of types of equipment and its destandardization decrease the series nature of production. Under the conditions of centralized planning it is impossible to justify this by any objective reasons. The hope that the situation in the area of standardization and specialized will be corrected without the state organization of the matter, is ephemeral.

It seems that during the immediate period on the basis of promising scientific and technical achievements IT IS NECESSARY TO DEVELOP THE STANDARDIZATION OF TECHNOLOGIES, TO INTENSIFY THE SECTORIAL AND INTERSECTORIAL STANDARDIZATION OF MACHINES, ASSEMBLIES, AND PARTS, AND TO INCREASE BY SEVERAL FOLD THE LEVEL OF THE STANDARDIZATION OF ITEMS WHICH ARE BEING NEWLY ASSIMILATED. This is one aspect of the matter--the technological aspect.

But there is also another task--TO INCREASE THE RESPONSIBILITY OF THE ORGANIZATIONS AND SPECIFIC PEOPLE, WHO VIOLATE THE STANDARDS. Its accomplishment creates a powerful stimulus for the development of the latest equipment and technology.

Attention should also be directed to another circumstance. THE NEED HAS ARISEN FOR THE SIGNIFICANT INCREASE OF THE ORIENTATION OF STANDARDS TOWARD HIGH INDICATORS OF ECONOMY, HIGH PRODUCTIVITY, QUALITY, RELIABILITY, AND SERVICEABILITY. These requirements should be exacting and well-founded, which will aim developers at the making of the most efficient technical decisions.

For the systematic increase of the technical level of production it is important to speed up the introduction in practice of long-range, "leading" standards for products for production engineering purposes, so that these standards would be used as norms with the changeover to new models and types of equipment.

In conformity with the decree of the USSR Council of Ministers "On the Organization of Work on Standardization in the USSR," (Footnote 2) (SP SSSR, No 4, 1985, Article 18), which was adopted in 1985, for the reflection in the standards by groups of similar products of the long-range needs of scientific and technical progress it is envisaged to differentiate the dates of the placement into effect of the indicators and requirements, which are established in them. This will help to correct the formed situation, when the norms and indicators of the standards record the already achieved level of the demands on a product, as if the lowest limit of its quality.

It is well known how great the losses from the insufficient delivery of components and materials can be. Their lack leads at times to the freezing of assets, which exceed by tens and even hundreds of fold the amount of the stipulated delivery. Positive experience in deliveries of complete sets has been gained at a number of enterprises. For example, the production and delivery to construction projects of complete sets of equipment, including apparatus, mechanisms, and instruments, which are produced by other ministries, have been organized in the sector of chemical and petroleum machine building.

In conformity with the new methods of management for the delay or insufficient delivery of equipment, items, and materials, which are a part of the delivery of complete sets, the supplier pays a penalty in the amount of 5 percent of the value of the complete production line, assembly, or unit to the main enterprise which is responsible to the delivery of complete sets.

An important direction of the acceleration of scientific and technical progress is the assurance of a substantial increase of the mobility of scientific and design collectives and the strengthening of the organizational forms of their contact with production.

In this respect many scientific production associations, which are ensuring, as practice shows, the shortening to two-thirds of the time of the development and introduction of new advanced equipment, have given a good account of themselves.

In the past few years a new form of the contact of science with production--scientific and technical centers--has been mentioned more and more often. Such centers of the sectorial type have given a rather good account of themselves in tractor and agricultural machine building and the electrical equipment industry. They engage in the development of new technological processes, the development of advanced equipment, and the assurance of the large-scale use of new technologies in production. The Institute of Electric Welding imeni Ye.O. Paton is solving similar problems on an intersectorial scale. Meanwhile the legal status of such organizations and their duties and rights so far have not been set down in a standard manner. This is leading to many difficulties in the organization of their work.

Already 10 years have passed since the time that the Statute on the Scientific Production Association (NPO), which was approved by the USSR Government, took effect. However, these associations are also now experiencing difficulties in the fulfillment of their tasks due to the fact that in the adopted statute the

emphasis in the functions of the scientific production association was shifted in the direction of current production. As a result the process of developing new equipment at the scientific production association proved to be under the strong pressure, for example, of the indicator of labor productivity, which is planned for the association.

So that the functions on the production of series output would not have an adverse effect on the activity of the scientific production association, it was decided to convert a number of scientific production associations as an experiment to planning according to the sector "Science and Scientific Service." But here the scientific production associations were again faced with the procedural resistance of sectorial planning organs, which, of course, do not want to "lose" the amounts of work of a production nature, which is performed by scientific production associations.

When determining the legal status--and this must be done immediately--of scientific and technical centers, especially intersectorial centers, specialists may be faced with serious difficulties and the resistance of an even larger number of departments. One should return to the critical analysis of the operation and especially the causes of the failures of introducing firms like the Fakel Firm (Novosibirsk). For abroad the number of these, as they are called, "venture" (risk) firms is increasing rapidly, although many of them collapse just as quickly. And this is not surprising: for their task is to determine quickly whether or not a scientific and technical innovation will sell.

It seems that in such (especially temporary) firms, of course, in case of their efficient work on behalf of the national economy the level of the remuneration of the labor of workers should be significantly higher than at ordinary enterprises which engage in current work. This will be as if additional pay "for taking risks."

At the same time the legal status of consultation organizations, which for the present have received very little dissemination (in Moscow, Novosibirsk), should be determined. For through them it is possible to use to an immeasurably greater extent the intellectual potential of our society.

Under the conditions of the greater and greater acceleration of scientific and technical progress the problem of increasing the mobility of the organizations, which are concerned with the development of science and technology, is being aggravated as never before. New organizations should be quickly established whenever this is needed and be eliminated no less quickly upon the completion of their tasks. Such possibilities are envisaged by enforceable enactments. However, for the present there are only a few temporary collectives. During this five-year plan the USSR State Committee for Science and Technology attempted, as was noted at the conference in the CPSU Central Committee on the acceleration of scientific and technical progress, to revise the network of scientific institutions, but did not see this work through. But there are many opportunities for the elimination and combining of scientific institutions. Here, for example, in the textile industry sectorial science has been organized on a subsectorial basis (flax, cotton, wool, and so forth). At present mainly multiple-component, mixed

fabrics are being used. Therefore, A POWERFUL SCIENTIFIC AND TECHNICAL CENTER, WHICH SOLVES SECTORWIDE PROBLEMS, IS NEEDED.

The most important direction of the work on the acceleration of scientific and technical progress is the stimulation of the human factor, first of all, of course, directly those who develop and introduce new equipment--designers and process engineers. On this level the Leningrad experiment is interesting. Its goal was to increase the responsibility and material interest of the workers of design and technological services in the increase of the technical level and quality of developments and in the fulfillment of a larger amount of work with a smaller number of personnel. In all the subdivisions, which took part in the experiment, the creative return became greater, a spirit of competitiveness appeared in the work of specialists, and executive discipline was tightened up appreciably. The number of personal was reduced during the 1st year by approximately 8 percent.

For the first time in our practice while conducting it the amounts of the salary increments for specialists who work efficiently were not limited by a ceiling. This shows that under the conditions of the clear specification of the status of labor collectives the rights of managers can be significantly broadened. The long-standing dispute about the possibility of paying bonuses to the workers of not only one's own department, but also other ones for the contribution to the development of new equipment was resolved favorably. And such a contribution can be very significant. Here is an example of the real removal of departmental barriers from the way of new equipment.

When settling the questions of the influence of management on scientific and technical progress it is always necessary to identify the legal conditions of its exertion. Only on this basis is it possible to speak about the most effective methods of managing the national economy and to strive for the more efficient introduction and use of scientific achievements.

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ORGANIZATION, PLANNING AND COORDINATION

COMPETITIVE FORM OF SCIENTIFIC, TECHNICAL DEVELOPMENT

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 9, Sep 85 pp 36-39

[Article by O. Omelchenko, chief specialist of the UkrNIIgiproselkhoz: "On the Competitive Form of Scientific and Technical Development"; passages within slantlines published in italics]

[Text] The leading role in the increase of production efficiency belongs to scientists and planning and design workers. But we are using for precisely this category of workers the "expenditure" method of the evaluation and remuneration of labor, which is most unprofitable for society. Thus, at a scientific research institute the cost of operations is determined according to the labor expenditures--the longer they work on a problem, the more they receive for it. At a planning institute of the construction type the established standard percent of the cost of construction and installation operations serves as the criterion of the evaluation and remuneration of labor. The more expensive the planned object is, the greater the cost of the design is. This is one of the causes of the increase of the cost of construction. The payment for the design documents is made in accordance with the number and complexity of the drawings.

The adverse effect of the "expenditure" method is natural, since it opposes personal and collective interests to public interests. The hope that departments, organizations, and workers will always give priority to state interests to the detriment of their own interests, does not have a real basis. "The /idea/ inevitably disgraced itself," Marx said, "as soon as it became detached from /interest/." (Footnote 1) (K. Marx and F. Engels, "Soch." [Works], Vol 2, p 89)

The activity of scientists and designers is of a creative nature which, hence, cannot be formalized. It is aimed at previously unknown areas and is always connected with uncertainty and with one degree or another of risk in the achievement of the desired result. The establishment of some formal standards for the evaluation of the results of labor will be an insurmountable obstacle for bold creative research. At the same time society cannot allow creativity not to yield positive practical results wherever it is possible and necessary to obtain them. The search for knowledge for the sake of knowledge itself is a very noble and frequently useful cause. But by recognizing as always

correct the assertion that a negative result in science is also a result, we risk exceeding the dose which separates medicine from poison.

As we see, there is a contradiction between the exceptional importance under the conditions of the scientific and technical revolution of the labor of the staff members of scientific and planning organizations and the lack of the objective evaluation of the results of their activity. The lack of its resolution weakens the monitoring on the part of society of creative activity, leads to the evasion of the solution of vital problems or to its dragging out, to the exaggeration of the results of labor, and to the making of a fetish of past services, hinders the high-quality selection and placement of personnel, and, in the end, adversely affects the pace of scientific and technical progress.

The competitive form of the performance of scientific and planning and design development, which at present is being limited on the plausible excuse of the saving of assets and the combating of duplication, is a simple and effective means of resolving such a conflict. The decree of the CPSU Central Committee and the USSR Council of Ministers of 24 September 1968 makes it incumbent to use the competitive form; it is stated in it: "For the purpose of the assurance of extensive competition in the area of scientific and technical development, the prevention of the occurrence of a monopoly in the solution of the most important scientific and technical problems, and the assurance of the choice of the most effective means of their accomplishment the USSR ministries and departments and the councils of ministries of the union republics, the USSR Academy of Sciences, and the sectorial academies of sciences are to entrust in necessary instances the conducting of basic scientific research work, as well as planning, design, and technological development to several organizations, which are heading in different directions, so that at the early stages of research....the best scientific, technical, and economic solutions would be chosen." (Footnote 2) ("Spravochnik partiynogo rabotnika" [Handbook of the Party Worker], Issue 9, 1969, pp 265-266)

It should be emphasized that the greatest effectiveness of the competitions is possible only in case of the obligatoriness and simultaneity of the carrying out of the same development by different performers. Many of the open competitions, which are held in our country, do not achieve the goal, since they reduce, in essence, merely to the examination by the judges of the finished results of operations which were performed at a different time prior to the announcement of the competition itself. The main thing is missing here--keen competition, which mobilizes creative forces, in the process of labor, which it is impossible to "evade," since this will immediately affect the official evaluation of activity.

The search for the solution of the same problem or a part of it should in accordance with the widely announced competition be entrusted to at least two organizations. This will make it possible to achieve the required variance and a comprehensive approach in development and will make it possible to create an atmosphere of informal competition and the conditions for the objective comparative evaluation of the results of the activity of the performers. The incompetence of one of the participants in the competition will inevitably and conclusively come through even in case of the absence of

norms of labor against the background of the successes of the other one, which is more talented and diligent and boldly and soundly takes risks in the achievement of the set goal. Competition and labor rivalry will force the performers to strive for the maximum result with the minimum expenditures. Under these conditions it is possible and necessary to evaluate labor, by directing attention to the best results.

The quite developed infrastructure of the scientific research, planning, and design base makes it possible to carry out competitive development without an increase of the number of workers and the assets being allocated by the state for the number of developments which are being carried out today in the country. First, already today many of them are being realized systematically in two and more versions. It only remains to entrust the study of the versions to several organizations instead of one, by which the obtaining of the end result will be expedited and, consequently, the expenditures will be reduced. Second, by the improvement of the planning of developments it is possible to decrease the level of the unplanned duplication of developments, the extent of which at present due to poor information comes to 60-85 percent. (Footnote 3) (See G.M. Dobrov, "Upravlinnya naukoyu" [The Management of Science], Kiev, "Naukova dumka", 1971, p 28) Third, if the amount, which is being allocated today for the solution of some problem, is divided among the competing performers of the former total number, which are conducting variant research under the conditions of objective comparative evaluation, which is oriented toward the quickest obtaining of effective solutions, we not only will expedite the development, but also will decrease its cost. For in the absence of clear standards of the cost and the duration of the performance of creative work nothing forces the individual performer to deliberately create for himself intense, at times risky conditions. Intelligence is dulled by the aspiration to avoid punishment for the upsetting of the planned deadlines. Therefore, the estimate and schedule, as experience convinces us, are drawn up with a large allowance. But then the plan itself serves as a hindrance, if it has turned out that it is possible to achieve the outlined goal more rapidly and less expensively. It is troublesome and disadvantageous for the future planning of one's work to change it.

The so-called estimated economic impact is not a serious obstacle in the overstatement of the time and cost of developments precisely because it is estimated, and not real. Its value is frequently determined not by the actual utility, but by the ability to "miscalculate" introduction. It is possible to estimate the proved impact only when a development has been assimilated in series production or has been embodied in other material forms and has been verified under the conditions of long-term and mass use. But a period of 5-10 and more years is needed for this.

Of course, when for the solution of very serious problems it is necessary to supplement the standard equipment of the performing organization with special expensive equipment, or when the required standard equipment is unique, the advisability of entrusting a development to one organization is not ruled. But in this case as well, wherever possible, the work should be organized on the basis of the principle of competitiveness, that is, two special-purpose groups of people should perform it. Among other things, an increase of the utilization ratio of equipment, which also decreases the cost of developments,

is achieved by this. Let us note that the tendency to use expensive equipment by the establishment of instrument centers both abroad and in our country has already appeared. Their purpose is to serve the research which various performers are conducting.

In the history of our socialist state and in its economic practice there are many examples and models of lively, creative competition for the best solution of scientific and technical problems. Thus, the development of a new airplane, which was begun in 1939, was carried out under the conditions of competition among many Soviet aircraft designers. The better flight and combat performance of the fighter and the shortening of the time for its development, in particular, were its criteria. Well-known Soviet aircraft designer A.S. Yakovlev described the mighty force of this informal socialist competition in his memoirs: "Everyone received an assignment. We left for our respective design bureaus excited, charged with the spirit of creative competition, with the firm intention to beat our 'rivals'." (Footnote 4) (See I. Changli et al., "Sorevnovaniye i konkurentsiya" [Rivalry and Competition], Moscow, Politicheskaya literatura, 1983, p 97) The usefulness, necessity, and world level of the effectiveness of such competition were convincingly demonstrated by the victories of Soviet pilots during the years of the Great Patriotic War.

Theoretical substantiation of the effectiveness of competitive developments from the standpoint of psychology also exists. Competition creates emotional tension which mobilizes all forces for the achievement of success. (Footnote 5) (See V.I. Dodonova, "Emotsii kak tsennost" [Emotions as a Value], Moscow, Politizdat, 1978, p 81) It is appropriate to recall that V.I. Lenin recommended to entrust the performance of difficult and important work, which does not have standard criteria of its evaluation, to several performers, "so that in each section of this work there would be two people, irrespective of each other, for mutual checking and the testing of various methods." (Footnote 6) (V.I. Lenin, "Poln. sobr. soch." [Complete Works], Vol 52, p 82) Lenin used this method extensively in his practice of management.

A broad and open discussion on the need for the increase of competitiveness in the fields of science and technology and on the major shortcomings of the ecknowledged individual determination of the ways and means of solving problems on the part of the main organizations has been underway in recent times. In the words of Corresponding Member of the USSR Academy of Medical Sciences S. Fedorov, "the monopoly of one direction in science leads to stagnation. The competition of scientific schools promotes progress.... Research in our country can and should be diverse, while the achievements can and should be common." (Footnote 7) (PRAVDA, 20 May 1984)

For all the obviousness of the advantages of the competitive forms of development, today they are almost not being used in practice. "Usually they entrust the designing of a project to one organization, which eliminates all possibility of the competition of creative collectives for the best solutions," D. Palterovich states. "Only in architecture is the competitive procedure being used quite often and successfully. As to the development of new machines and technological processes, I, unfortunately, have not been able

to find examples of when such problems have been solved on a competitive basis." (Footnote 8) (PRAVDA, 9 February 1985)

The sole attempt at competitive designing in the food industry, when three institutes were simultaneously commissioned to develop designs of a model bakery, is nearly unique. The efficiency of the end result exceeded by many fold the "extra" expenditures on designing. And this is natural. For, as was established, each additional ruble, which is spent on the search for the optimum versions, saves 10-15 rubles. (Footnote 9) (PRAVDA, 27 August 1984) That is why a negative trend is the fact that "in the past 6 years the proportion of planning and surveying work in the amount of capital investments has decreased from 2.2 to 2 percent. Meanwhile in world practice the latter indicator is two- to threefold greater." (Footnote 10) (Ibid.)

The planned increase of the cost of planning work and the extensive use of competitive forms in designing are aimed at correcting the situation. And, what is also important, the "expenditure" method of determining the cost of designing (as a percent of the cost of construction and installation work) will be replaced by another one, for which the physical indicators of the object being designed: the production capacity, the length, the cubic volume, the area, and others, are the basis. The designer now will not be interested in increasing the cost of construction. Steps are also envisaged so that everything that has been designed would be built. This will make it possible to decrease the considerable losses from designs, which are developed "for the shelf," and to channel a portion of the saved assets into the search for the most effective solutions by the competitive method.

One of the most important potential advantages of the socialist system consists in the possibility of making not only an "internal" (within the performing organization), but also an "external" comparative evaluation at all these stages of development, starting with the statement of the problem and the choice of the direction of the search for its solution and ending with the development and testing of experimental models. It is possible to use the results of these evaluations for the effective stimulation of collectives and individual workers, who are carrying out simultaneous versions of development, and for the mutual correction of the search in the direction of the achievement of the best solution in the shortest time.

Under the conditions of the scientific and technical revolution, when the rapidly increasing complexity of scientific and technical problems is coming into dialectical contradiction with the need to expedite their solution under the conditions of the ever increasing shortage of resources of production and the aggravation of ecological problems, this means of technical progress is optimal. Socialism provides an opportunity for its use in all fields of science and technology through the competitive form of development. The disregard of one of our most important advantages, which guarantees significant economic gains, is in no way justified. It makes no sense to economize on noncompetitive univariant developments, since such a kind of "economy" will devastate more rapidly than any wastefulness. It is always advantageous to study more carefully and comprehensively decisions on paper, and thereby not to allow losses from the introduction of "crude," or else totally useless developments.

The noncompetitive form of performing scientific, planning, and design work is based on the idealized (and therefore detrimental to the end practical results) theoretical premises about the technical infallibility and comprehensiveness of the approach and care in the labor of one performer. This, of course, is unrealistic not only for its univariant developments, but also for the few developments at present, which are being carried out by it in several versions. The performer cannot work flawlessly, especially under the conditions of the incomplete coincidence of the personal and collective interests, which are created by the "expenditure" method of the evaluation and remuneration of labor in combination with the individual solution of the posed problems. By using the noncompetitive form, we, in essence, are deliberately, already by the plans of scientific research and experimental design work, dooming developments to a low quality of fulfillment and are hindering scientific and technical progress.

Competitive development will inevitably force scientific research and planning and design organizations in their work to orient themselves only toward the maximum and quick success. While this implies the fundamental need for the constant display of talent and diligence and an inclination for world novelty and for the bold and justified taking of risks.

Competitiveness in development, in addition to the solution of the main problem--the rapid obtaining of high-quality results, will make it possible, finally, to solve ripe problems: the establishment of the fair evaluation and remuneration of individual labor, the selection and placement of personnel. Of course, it is not easy to evaluate the real individual contribution and the labor potentials of each scientist and planning and design worker. But experience attests that in the collective they know also without formal "scales" who is working how and who is capable of what. If only there were an urgent need for the constant display of adherence to principles in evaluation (and this ensures competitiveness in development), and the managers used the opinion of the collective for the reliable protection of their organizations against incapable and unscrupulous people, as the Law on Labor Collectives requires. One of the possible practical means of such an evaluation was set forth by us earlier. (Footnote 11) (See A. Omelchenko, "The Evaluation and Remuneration of Individual Labor," EKONOMIKA SOVETSKOY UKRAINY, No 2, 1984, pp 50-54)

The lack of competitiveness in development is the basis of the overstated value of its results, while this, in turn, inevitably involves liberalism in the evaluation of staff members. Life has shown that it is impossible to rely on the effectiveness in the solution of this problem of the certifications of engineering and technical personnel and the competitions for scientists, which are regularly held in the country in accordance with all-union methods. They are significant with respect to the expenditures of forces and assets, but are practically imperceptible with respect to the results. Academician M.N. Kolosov writes in this regard that the existing recertification "...usually consists not in the reelection to the position of one of several competing candidates, but reduces to automatic reconfirmation for a new term." (Footnote 12) (M.N. Kolosov, "In Modern Science There Is No Place for Mediocrity," KHIMIYA I ZHIZN, No 12, 1983, p 10)

Finally, the competitive form of conducting development will simplify the monitoring of the activity of scientific research institutes, design bureaus, and planning institutes. A string of defeats in competition will be an automatic and reliable signal of trouble in the collective.

Competition in the search for solutions of the same problem conforms best to Lenin's principles of its organization.

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ORGANIZATION, PLANNING AND COORDINATION

ELIMINATING OBSTACLES TO IMPLEMENTING TECHNICAL DEVELOPMENTS

Minsk SOVETSKAYA BELORUSSIYA in Russian 24 Dec 85 p 2

[Interview with Doctor of Technical Sciences Professor Yevgraf Iosifovich Belskiy, honored figure of science and technology, chief of the Materials Science and Foundry Work Chair of the Belorussian Polytechnical Institute, by I. Mostkov under the rubric "Scientific and Technical Progress: Problems and Opinions": "A Hurdle Race"; date, place, and occasion not given; first paragraph is SOVETSKAYA BELORUSSIYA introduction]

[Text] The Materials Science and Foundry Work Chair is one of the most effective at the Belorussian Polytechnical Institute. With respect to the basic indicators it might as well compete with other sectorial scientific research institutes: the results of the studies of the chair annually give the national economy 50 and more inventions and a profit of up to 1.5 million rubles, a number of developments have been patented abroad. Doctor of Technical Sciences Professor Ye.I. Belskiy, an honored figure of science and technology, is in charge of the chair. I wrote 6 years ago, in November 1979, on the pages of SOVETSKAYA BELORUSSIYA about the successes of the collective of the chair. And I have come here again in order to continue the story. But the conversation turned to another thing, to several problems of increasing the efficiency of science of the higher educational institution....

[Answer] "Am I satisfied with the results of the work of recent years?" Yevgraf Iosifovich asks again. "Both yes and no. Of course, much has been done. At the end of the last five-year plan there were 14 candidates of sciences in the chair, now there are 22. At that time they were threatening an economic impact of 500,000 rubles, now an economic impact of 1.5 million rubles seems inadequate. They set up two research laboratories, including one sectorial one, of the Ministry of Local Industry. The educational process was improved appreciably. They put into operation more than 10 educational research laboratories which are furnished with modern equipment. So it is a sin to take offense at the colleagues of the chair--they are working conscientiously. But not so much the work itself as its return to the national economy is important. Our successes to a significant degree are implemented not at the institute itself, but in production. In particular, the efficiency of science depends on the scale of the implementation of its achievements. But even a high level of research does not always guarantee a broad scale of introduction."

[Question] "Is this really the fault of the chair? The certificates of authorship and patents are proof of the novelty of the developments, introduction is evidence of their topicality. While your chair is doing very much, I believe, for the promotion of innovations, including searching persistently for new forms of this propaganda and means of increasing its effectiveness. I remember that not very long ago you, Yevgraf Iosifovich, shared on the pages of our newspaper the experience of the organization of specific and goal-oriented technical propaganda. You oppose to simple scientific and technical educational activities such constant contact with production workers, which would directly affect the introduction of the developments of the chair. Not by chance did precisely your chair organize under the Belorussian SSR State Planning Committee a permanent seminar on problems of casting materials science and for the most part is supporting its work."

[Answer] "Yes, we are striving for the most rapid advance of new technical ideas into practice. And some successes, indeed, exist. The matter is being hindered (this concerns not only our chair, but also, perhaps, all science) by the lack of effective organizational and economic levers which would make the ignoring of scientific innovations simply impossible."

[Question] "Do the best developments really not obtain extensive dissemination? For tens of enterprises of the country have taken an interest in the foundry compounds, by means of which it is possible to ensure simultaneously the significant strengthening of the surface layer of the castings, or in the diffusion-active technological coatings, which make it possible to increase sharply the durability of the stamping tool, and a number of other works...."

[Answer] "They have taken an interest.... And all the same each time, at each plant it is necessary, first, to 'push through' the idea and, second, to deal ourselves with the introduction in the entire vast amount of this in many ways thankless work. For example, the same coatings. Here are the certificates of various enterprises (Perm, Gorkiy, Gomel, Klaypeda, Riga, and so on) on the economic impact--on the average 60,000-70,000 rubles a year at each enterprise. It seems convincing. But at a number of nearby plants the innovation is being introduced reluctantly, slowly, not as would be liked. What, they say, is it for, if a large consumption of stamping tools is envisaged by the norms?(!) The enthusiasts understand, while the seekers of a quiet life refuse."

[Question] "By the way, at one time I told in the newspaper about such a development of your chair as the recovery of molding sand. Has this process been introduced?"

[Answer] "The story with this recovery is an excellent example of what was expressed in the title of that article--'Ideas Seek Work.' In the past 6 years the chair not only improved the method of recovery, but also proposed several new versions of it. Ultrasonic recovery has justified itself at the Minsk Machine Building Plant imeni Kirov, electrohydraulic recovery is being introduced at the Minsk Plant of Automatic Lines. That is nearly all the addresses. But it is well-known: quartz sands are becoming more and more

scarce, while the need for them is estimated in the millions of tons and is continuing to grow. Meanwhile the recovery of these sands guarantees a practically waste-free technology. It does not require either imported equipment or excessive capital expenditures. And once again: why complicate matters unnecessarily, check, worry, it will come to no good, if assets are being allocated for this sand, there is money.... Thus 6 years passed. I am afraid that not just another year will pass until the matter acquires the proper scope."

[Question] "You have touched upon another problem: the constant concerns about the introduction of old developments are tearing scientists away from new research."

[Answer] "To some extent this is inevitable. The first, second, and at times third introduction of one innovation or another is accompanied at times by its modification and attachment to a specific works. But further, probably, it will be more proper if the engineering personnel of the enterprise or the workers of the sectorial scientific research institute deal with such attachment. While consultative assistance and the right of supervision would be reserved for the authors. Otherwise a dilemma actually arises for scientists: to engage in new research or to introduce the developments of past years. The attempt to reconcile this contradiction has the result that, having refused assistance to two or three enterprises in the assimilation of the innovation, scientists are frequently forced to evade work in the future. Since there is actually no one to deal with the 'circulation' of introduction, the scale of the assimilation of an innovation may simply remain at the level of one or two enterprises. There are many examples of this. And in our chair there are at least 12 developments, which are ready for industry, have already justified themselves at several enterprises, and have not 'made themselves heard' at other plants.

"At the same time the system of scientific and technical information is posing for itself primarily familiarizing goals, although it can influence significantly more actively the establishment of permanent relations of production and scientific collectives and the solution of problems of introduction. In particular, our chair needs assistance in advancing into production urgent technical innovations, which are connected with the use of large-tonnage waste products and resource-saving technologies, the saving of very scarce materials, and so on."

[Question] "Yevgraf Iosifovich, you spoke about the connection of production with science. But usually they make it the duty of science to establish these contacts, they hold it accountable for the scale of introduction...."

[Answer] "It is a matter, of course, not of words. But I am convinced that it is more correct to speak about the strengthening of the contacts of production with science, and not vice versa, and to hold both parties accountable for the effectiveness of these contacts. With respect to each study one should, I believe, envisage extensive assistance in the introduction of the results. The research programs of various kinds, which are now in effect, planned, as a rule, once again only initial introduction."

[Question] "But will not subsequent introductions, if scientists themselves do not engage directly in them, require quite high skill of engineering personnel?"

[Answer] "But do not the other aspects of scientific and technical progress really not require the same thing? However, this, apparently, is the theme of an independent and very detailed discussion, which is already underway on the pages of the press. I want merely to express briefly the conviction that production needs both its own scientists (they do exist, but for the present there are very few of them) and highly skilled engineers. Their shortage is especially being felt in such fields as the technology of production and materials science, computer-aided design systems, robotics, and flexible machine systems. Higher educational institutions, for example, are not training at all engineers in the specialization of materials science in machine building, while the course of material science is extremely brief. In the end this costs production dearly."

[Question] "But is something being done at this level at your chair?"

[Answer] "Exactly, something. What depends on the chair. Little depends on it, for there are the curricula, syllabuses, and other regulating documents. Therefore, I regard as ripe the question of serious changes in the work of the higher school. It is very important to improve the activity of each higher educational institution and all the subdivisions of the higher educational institution. Thus, we are planning the intensification by our chair of the computerization of the educational process, the changeover from chair to interchair laboratories, and so on. True, in case of any structural changes, in science in particular, the medical motto 'Do No Harm' is important. One must not, it seems, wreck the established fruitful research collective, it is necessary to treat very considerately their moral health and to save the good traditions. I am saying this, knowing the statements of several of my colleagues, who are advocating hasty, inadequately considered reforms...."

[Question] "Thus, returning to the beginning of our conversation, your view of the successes, Yevgraf Iosifovich, is somewhat ambiguous...."

[Answer] "Yes. The gains are unquestionable, there is quite rapid progress, I have in mind not only our chair, but also the entire institute, and science of the higher educational institution in general. But this progress is somehow reminiscent of a hurdle race. To eliminate them--that is the task...."

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ELIMINATING ERRORS OF EQUIPMENT DESIGNERS

Moscow PRAVDA in Russian 25 Dec 85 p 3

[Article by M. Bashin, a member of the Scientific Council of the USSR Academy of Sciences for the Economics of Scientific and Technical Progress (Moscow): "The Designer Made a Mistake.... Problems and Opinions"]

[Text] The modern contract design, which has embodied the latest scientific and design ideas, is not only a set of documents, which has thousands of drawings, calculations, and technological regulations.

Large financial and material resources are materialized in it. And it is reminiscent of the plan of the conducting of military operations, in which everything should be well calculated and envisaged. Otherwise significant economic losses are inevitable: for the value of a turbine, a modern airliner, or other objects amounts to the millions of rubles. Given such a scale even a small mistake or miscalculation turns into significant losses.

State appraisal, which ensures the strict monitoring of the level and quality of contract designs, is in effect in the country. This strictness is justified--for the present the number of designs, which are being returned for modification, is still large. In 1982 of the 10,665 designs, which underwent appraisal, nearly a third were changed. The basic reasons are mistakes of designers and a low level of the technical decisions.

Modern designs and miscalculations of their developers.... At first glance such a combination is of a paradoxical nature. However, let us take a look at the laboratory of the creators of new equipment. Only to the uninitiated does it seem that the people, who are engaged in the development of new equipment, are insured against mistakes. An analysis testifies otherwise--even the experienced designer or process engineer approximately every 4 hours of the workday makes a mistake of average complexity. Minor mistakes are encountered more frequently. The elimination of a mistake of average complexity at the stage of the preparation of the technical specifications costs 5 rubles. If it is identified in the shops of the pilot works, its cost is 90-100 rubles. In series production the accounting office will calculate losses in the amount of tens of thousands of rubles. If the mistake is detected after the output of the finished product, the national economy will bear losses which amount to

millions of rubles. Such is the increase of the harm due to miscalculations of developers.

For example, 50 machine tools of models L-385 and L-386, which were developed by the All-Union Scientific Research Institute of the Bearing Industry and the Special Design Bureau of Grinding Equipment, were produced at the Machine Tool Building Plant imeni Vladimir Ilich. The machine tools proved to be unfit for the machining of bearing races. The losses came to 1.2 million rubles. The culprits are the staff members of the planning and design organizations which issued the low-quality documents.

The economics of scientific and technical progress imperiously requires that such mistakes be eliminated at the earliest stages, when the losses have not yet picked up speed.

One of the reasons for mistakes is deviation from the prevailing all-union state standards. Thus, of the 56 drafts of technical specifications, which were drawn up by institutes and special design bureaus of the Ministry of the Machine Tool and Tool Building Industry, 44 proved to have gross violations of the prevailing all-union state standards. Just the alteration of the prototypes cost nearly 600,000 rubles.

What here depends on the professional skill of the developers of new equipment, gained experience, and many other personal qualities, including the overall culture of the worker, and what depends on objective conditions, shortcomings in the organization of labor, and the forms of monitoring and stimulation?

The entirety of the responsibility for the made decisions and their embodiment in metal rests with the specific performers--from the rank and file designer to the manager of the project. Of course, a person is not a machine and not a robot, therefore, he makes both purely professional and creative mistakes. But the mechanism of the identification of mistakes should come into action--moreover, at an early, if it can be put this way, discussion stage of designing.

Let us also examine the mistakes during the embodiment of a made technical decision. The analysis showed that the bulk of them pertains to incorrect indications of dimensions and tolerances and miscalculations when choosing the materials and the methods of machining the parts. They should be inevitably identified by the services of standard control at the earliest stages of the development of the technical specifications.

There are, however, mistakes of a different order. My efficiency proposal, which yielded a large saving, was introduced several years ago. In one design the steel sheet 7 millimeters thick was replaced by a thinner sheet. The strength of the object was preserved by means of so-called stiffening ribs. As a result 90 tons of sheet worth 18,000 rubles were saved. Why did I, an economist, who does not deal directly with development, notice the obvious miscalculation, while tens of specialists did not direct attention to the fact that an increase of cost is incorporated in the design? A breeding ground for such mistakes is haste and the lack of elementary designing culture.

In the machine building sectors more than half of all the cases of the upsetting of the plan assignments on the assimilation of new equipment are connected with omissions and mistakes in the technical specifications, which were detected at series-producing plants. It was noted that the faults appear most often at the meeting points of the design and engineering services, when one performer "is no longer responsible," while the other "is not yet responsible" for the object. An integrated system, which encompasses all the stages of designing, is needed here.

The experience of evaluating the work of designers, which was introduced at the Ivanovo Machine Tool Building Association, merits attention. Here the design documents are transferred as if over a conveyor, by stages, as they are ready. First they are developed for the basic, most labor-consuming assemblies and are turned over to the process engineers, who, without losing time, begin their own stage of the work. The mobile system shortened the cycle of the development of an object to one-third to one-half. At the same time the number of designing mistakes were reduced drastically. Previously they reached the culprit in a few years, when the object was in production. Now the conditions have appeared for continuous designer's supervision and the making of adjustments during the work.

Of course, it is difficult to expect of each designer technical decisions at the level of T. Edison, A.S. Popov, S.P. Korolev, or O.K. Antonov. But we do have the right to demand that new machines or other items would conform to the highest achievements of world science and technology and would be based more often on inventions. Today, however, this is also no longer enough. Engineering decisions should be checked without fail by the algebra of economic evaluations. Their absence is a signal that serious miscalculations have been made and wasteful designs will appear. Constant contacts of the developers of new equipment with production workers are of great importance.

The designers of the All-Union Scientific Research Institute of Diamond Tools and the Processing of Diamond Machines, who are developing highly productive tools, are constantly maintaining direct contacts with many plants. It is believed that the sharp eye of plant workers will detect more rapidly design miscalculations or the low technological feasibility of an innovation. It is important that designers and process engineers would rely on a good pilot experimental base, which makes it possible to check carefully each decision in metal. Then the young designer also quickly learns: what was without a hitch in a drawing, is not yet a success, and, it would seem, a part, which is exquisite on Whatman drawing paper, in metal at times looks like such a monster.

At the conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress and in the precongress documents of the party the need to stimulate the human factor and to see to it that everyone at his own workplace would work conscientiously and to full effect, was noted.

The task of increasing the prestige of designing and engineering labor, which has declined significantly in recent years, is arising with all urgency. A

good designer is the fixed capital of domestic machine building. The names of the most talented of them should be well known and be an object of esteem.

Some designers get carried away by the novelty of design decisions for the sake of novelty itself, which often assumes the form of an empty attempt to be original. As a result the losses increase due to the inadequate use of unified and standardized parts. The rejection of the modular principle of designing, which has shown its worth, should also be grouped with the mistakes in designing activity.

Calculations have shown that in the development of a new instrument the use of parts and assemblies, not more than 15-20 percent of which are original, is economically justified.

Today there are still many routine processes in the labor of a designer and planner. The reason is the discrepancy between the constantly increasing complexity of new equipment and the obsolete methods of its designing. Computer-aided design systems--SAPR's--should become an important help in increasing the degree of economy of developments. Thus, the use of computer-aided design systems at the All-Union Scientific Research Institute of Electromechanics made it possible to speed up by five- to sixfold the development of induction motors and to decrease sharply the number of professional mistakes. The computer-aided design systems at the Elektrosila Production Association and other organizations have given a good account of themselves. They do not simply take upon themselves a portion of the designers' labor, but also make it possible on the basis of the examination of many versions of designs to find the optimum characteristics and ensure the efficient technological preparation of production. The opportunity is arising to quickly transfer from the television screen, on which the designing of parts and assemblies is carried out, the program of their production without a drawing directly to the machine tool. All this has already been implemented at individual works and should be disseminated extensively.

It is important to evaluate correctly the available reserves in this area. Many scientific research institutes and design bureaus are still being poorly supplied with modern computers, which increase the qualitative level of design developments and decrease sharply the number of mistakes during the development of innovations. Without the solution of this problem the attempts at computerization in the development of new equipment will turn into unproductive expenditures. The automation of work in this sphere also increases substantially the skill of developers, since in case of computer designing they become familiar with new computing methods and hardware and enrich their experience during the analysis of a large number of engineering decisions. The ability to use computers is a guarantee of the sharp decrease of the number of professional mistakes. Today the designer, process engineer, or inventor cannot be full-fledged creators of new equipment, if they are not able to use the methods of computer-aided designing. A great impact should be expected from the reform of school education. It will be significantly easier for future designers and process engineers, who are familiar from an early age with the principles of programming and information science, to master computer-aided designing.

The important steps on the acceleration of scientific and technical progress, which are being taken in the country, are also making it possible to place the creative labor of the developers of new equipment on a firm base, to reduce technical mistakes to a minimum, and to eliminate the economic losses to which they give rise.

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GOALS, FORM OF INTERSECTORIAL SCIENTIFIC, TECHNICAL COMPLEXES

Moscow TRUD in Russian 24 Dec 85 p 2

[Interview with Vladimir Petrovich Vashchenko, a member of the collegium and chief of the Scientific Organizational Administration of the USSR State Committee for Science and Technology, by TRUD correspondent A. Pankov under the rubric "We Report the Details": "'Biogen' and Others"; date, place, and occasion not given; first paragraph is TRUD introduction]

[Text] As has already been reported, the CPSU Central Committee and the USSR Council of Ministers have adopted a decree on the establishment of intersectorial scientific and technical complexes and measures on the support of their activity. A TRUD correspondent asked V.P. Vashchenko, a member of the collegium and chief of the Scientific Organizational Administration of the USSR State Committee for Science and Technology, to comment on this decision.

[Question] Vladimir Petrovich, tell us, please, in greater detail about the goals of these new scientific formations.

[Answer] First I will note that this form of the organization of scientific activity arose not in a void. As is known, several years ago scientific and technical complexes appeared, for example, at the institutes of the Ukrainian SSR Academy of Sciences. The experience of the best scientific production associations was also taken into account when setting up intersectorial scientific and technical complexes. What did practical experience suggest to us? The quickest possible covering of the thorny path from basic research to the practical use of its results is possible only when there is no gap in all its stages: "the idea--the design--the model--the series," when all of them are connected fundamentally or, moreover, are implemented at the same place and are subordinate to a single management. It is well known that after the establishment of scientific production associations the time of introduction was shortened here and there to one-third to one-half. And the technical level of developments there is high.

And after the June conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress the suggest was made: taking this experience into account, to establish intersectorial scientific and technical complexes in the priority directions.

[Question] In which ones?

[Answer] So far the decision has been made to establish 16 scientific and technical complexes. The complex for electric welding in fact already exists--at the base of the Kiev Institute imeni Ye.O. Paton. It is interesting that owing to thorough scientific research the quite narrow technological direction has been able to spread its influence far beyond welding proper--to special electrometallurgy, surface deposition, brazing....

The Svetovod Complex, in which the Institute of Radio Engineering and Electronics of the USSR Academy of Sciences is the main organization, will deal with the problems of light fiber optics.

The complex, which is being set up on the basis of the Scientific Research Center for Technological Lasers of the USSR Academy of Sciences with the participation of the Ministry of the Electrical Equipment Industry, should make a significant contribution to the development of one of the most advanced methods of machining materials.

Microelectronics has been called a catalyst of scientific and technical progress, and among the most important tasks is the supply of planners, designers, process engineers, and other engineering and technical personnel will modern high-speed, reliable, small personal computers. The scientific and technical complex under the aegis of the Institute of Informatics Problems of the USSR Academy of Sciences will also solve this problem.

A great future awaits the rotary and rotary conveyor lines which were developed under the supervision of Academician L.N. Koshkin. They can automate the most diverse processes, increase by several fold (at times even by tens of fold) labor productivity, and save production space. The Rotor Scientific and Technical Complex is called upon to accomplish the task of the development and more extensive introduction of this advanced equipment.

In recent times particular importance has been attached to the development of biotechnology. This also found its reflection in this decree: the Biogen Scientific and Technical Complex is being established.

The Institute of Machine Science of the USSR Academy of Sciences will be in charge of the Nadezhnost mashin Complex, the activity of which will concern literally all sectors of the national economy....

Several scientific and technical complexes are arising in some one sector, for example, the Robot Complex at the Experimental Scientific Research Institute of Metal Cutting Machine Tools of the Ministry of the Machine Tool and Tool Building Industry, the Metallurgmash Complex at the All-Union Scientific Research, Planning, and Design Institute of Metallurgical Machine Building, the Membrany Complex in the Ministry of the Chemical Industry, the Nefteotdacha Complex in the Ministry of the Petroleum Industry, and so on. But they will also act as intersectorial organizations.

[Question] The existing scientific production associations usually consist of three subdivisions: scientific research, design and technological, and pilot production. But what will the structure of the scientific and technical complexes be like?

[Answer] In principle the same. An academic or sectorial institute, which is sufficiently authoritative in the given direction and has a good scientific reserve, which is also the basis for the achievement of quick practical results, will be the main organization in them.

[Question] But the experience of the scientific production association showed that there is no sufficiently strong financial and organizational connection between its three basic subdivisions....

[Answer] The drafting of the model statute on the intersectorial scientific and technical complex is now under way. In particular, the complete organizational and economic unity of all the subdivisions of the complexes has been planned. The institutes themselves with their design and pilot base are merely the nucleus of the scientific and technical complexes. Many organizations and laboratories of higher educational institutions and sectorial organizations and laboratories will take part in the development and introduction of innovations. They will retain their departmental affiliation, but the scientific and technical complex will assume their procedural supervision, the planning of their activity, and even, as we propose, their supply with resources. Moreover, I would like to stress, supply should be priority, that is, very rapid and with the most advanced equipment. Moreover, the scientific and technical complexes will coordinate in the country the work of all organizations in the given scientific and technical direction, even those which formally will not be included in the complexes. They are being made responsible on the all-union scale for the level of research and development.

[Question] Is there not the danger that, having become a monopolist in a specific direction and by fulfilling its specific tasks well, the scientific and technical complex will nevertheless limit the activity of relate scientific organizations, will intentionally or unintentionally narrow the sphere of scientific research, and will even hinder the development of "secondary," incidental ideas, from which new promising directions, entire fields of science, and technologies frequently arise?

[Answer] Such a danger is not ruled out? Therefore, a certain independence in scientific work should be retained. We are envisaging this.

[Question] At the same Ukrainian academic institutes not only scientific and technical complexes, but also so-called engineering centers have been established. Will they now find their legal ratification?

[Answer] Yes. Their activity will be regulated in a separate model statute.

[Question] The final product of the scientific and technical complexes is new technologies, materials, and prototypes of equipment. How will the relations with sectors with respect to series production be realized? Will we not lose

with sectors with respect to series production be realized? Will we not lose years waiting until one ministry or another "finds the resources?"

[Answer] These complexes through the USSR State Committee for Science and Technology will submit to the USSR State Planning Committee their finished models for the inclusion of their production in the next annual plan. So there should be no losses of time on mass introduction.

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TRAINING AND EDUCATION

UNIVERSAL COMPUTER EDUCATION IN ARMENIA

Yerevan KOMMUNIST in Russian 13 Sep 85 p 2

[Article by Candidate of Technical Sciences L. Peshtmaldzhyan, chief of a department of the Armenian Affiliate of the Scientific Research Institute of Problems of Organization and Management of the USSR State Committee for Science and Technology, under the rubric "The Boundaries of Scientific and Technical Progress": "Universal Computer Education"; capitalized passages published in boldface]

[Text] In some people the idea of the nonessential nature of mathematics, the making of complicated calculations, and at times also simply their uselessness was ingrained from their school days. Many engineers manage without multivariant calculations, relying on their experience and intuition. Even accountants--traditionally a calculating specialty--have contrived in recent years to reduce to a minimum the number of indicators of the economic activity of organizations, which are taken into account and calculated.

The computer is being presented mainly as a tool of enormous mathematical possibilities, one of the characteristics of which is high speed, which is estimated at hundreds, thousands of operations a second.

But it not only that way, or not entirely that way. It would be more correct to say not EVM [computer], but IVM--information and computing machine. Computers are small arithmometers for the making of complicated calculations. Modern computers 80 percent of the time operate AS INFORMATION MACHINES AND SOLVE INFORMATION PROBLEMS, while the numerous computer centers of enterprises and sectors are factories which process and generate...information.

Just as in "the age of machines" we increased our physical possibilities a thousandfold, today by means of computers we are increasing our mental possibilities and are freeing ourselves from the performance of routine uncreative operations. The possibilities of the computer in case of the performance of uncreative jobs (that is, jobs which have algorithms of their performance and lend themselves to formal description) are truly unlimited and impressive. A display screen, a printer, and a plotter are an integral part of any computer. Such a computer can draw sequences of frames of animated cartoons, make working drawings from sketches, advise a patent at a polyclinic, be a partner in various games, help a housewife to spend the

family resources economically--you will not list all the occupations of a computer. Electronic robots and the most advanced machines, which not only free us from difficult manual labor, which has been retained here and there, but also submit to our will and readjust themselves for the performance of other operations, are already moving about the shops of our plants. They ensure the output of new items in the shortest time. Electronic robots are the basis of flexible machine systems. Miniature computers, so-called microprocessors, which marked a new important stage in the development of computer technology, have been installed in each of these robots.

During the 12th Five-Year Plan personal computers for everyday use, which initially will be used autonomously, but then within computing and data processing networks, which will enable the owner of the computer to request and receive instantaneously the most diverse data, for example, reports on train, bus, and airplane traffic, will begin to arrive at the stores of the country.

What is needed so that the possibilities of computers would become accessible to each of us? Precisely each, be it a worker, an employee, an engineer, a humanities scholar, an artist, a composer, or a sportsman. There is one answer--EVERYONE MUST LEARN TO COMMUNICATE WITH THE COMPUTER. All of us should turn into so-called users of computer technology.

It cannot be said that this question is new for our republic. Lectures on the use of computer technology, automated control systems, and flexible machine systems have been given for many years at the Faculty for the Improvement of the Skills of Management Personnel and Specialists of the National Economy of Yerevan Polytechnical Institute and at a number of other sectorial institutes and courses on the improvement of skills. The students grasp the concepts of an algorithm, a program, and information, which are new for them, do course projects, and in field lessons familiarize themselves with computer centers. But we, the instructors, are left with a sense of dissatisfaction, since almost none of our students (people 40 years old and older) is using the obtained knowledge on the job. Moreover, due to the lack of the appropriate study centers, which are equipped with computers, we are not teaching direct communication with computer hardware.

Several years ago the Chair of Automated Control Systems of Yerevan Polytechnical Institute took under its patronage the Yerevan Russian Secondary School imeni F.E. Dzerzhinskiy, at which they set up a circle for the study of the principles of computer technology. A Nairi-2 computer was turned over to the school. Unfortunately, this work did not go beyond a "short-term campaign" and did not receive proper support on the part of educators.

Recently the course "The Fundamentals of Information Science and Computer Technology" was introduced at all secondary schools, tekhnikums, and vocational and technical schools. Thus, the task of the implementation of universal computer education and the acquisition by all the members of our society of computer literacy is becoming a problem of state importance.

Initially student youth should master the principles of interaction with the computer, then with the assistance of the teacher and the same computer

continue to study the most diverse subjects. The computer will perform the role of a coach, who fully implements an individual approach to each student. The teaching computer is not information from textbooks, which is lit up on the screen, but an active adaptive system. With each training session it will recognize better and better its students, who have their own password for conducting a dialogue with it.

A large number of problems, which should be solved by educators in close cooperation with specialists in computer technology, are arising here. It is very important that the educator would continue to sense himself to be the main person in the educational process, a teacher and researcher, who poses problems for mathematicians, programmers, and systems engineers. The mistakes made during the computerization of production processes and control processes, when skilled process engineers and competent administrators frequently dodged work on the use of computer technology, regarding this as the domain of narrow specialists, must not be repeated.

Here and there skeptical cries are being heard: Will not the computer choke the creative abilities of the pupil, will not contact with "the piece of iron" bore him very quickly, will not a sense of individualism and isolation from comrades arise in him, is it not harmful to sit for hours at a display screen, and so forth?

The answers to these questions are the theme of a special discussion, but it is not out of place to recall, as A.S. Pushkin wrote, that at the basis of any creative work there is a craft and it is no less correct to ask the question about the means of developing creative abilities with the aid of a computer. A broad field of creative work for educators, tutors, and teachers and an abundance of research for workers of all specialties and first of all the representatives of the social and psychological sciences are being afforded.

A large role in the development and efficient application of computer technology and the study of the principles of its application belongs to Komsomol members and youth. The republic Council of Ministers and State Planning Committee are giving must assistance to this work.

On the initiative of the Komsomol members of the Armenian Affiliate of the All-Union Scientific Research Institute of Problems of Organization and Management of the USSR State Committee for Science and Technology and with the effective support of the Scientific Youth Department of the Armenian Komsomol Central Committee a multiple-skill creative youth collective, which is developing computer-aided teaching systems, was set up at the institute. In a short time this collective, which both the board of directors and the council of young scientists and the council of the primary organization of the Scientific and Technical Society of Radio Electronics and Communications are helping, carried out a number of serious practical operations on the development of the Manuk computer-aided teaching system for students of general educational secondary schools with instruction in Armenian. The system is being developed on the basis of an Elektronika-60 microcomputer of the terminal computer complex. Komsomol members Vachagan Oganyan, Tirgan Zargaryan, Avgik Maykogulyan, Susanna Vasilyan, and others developed and produced a series of hardware and software, which ensure the input and output

on the display screen and thermal printer of the computer of textual information in Armenian. Programs, which make it possible to edit Armenian texts, to conduct a dialogue with the computer in accordance with the "menu" principle, and to respond to various kinds of thematic reference inquiries, have been developed. In cooperation with linguists work is being performed on the development of a Russian-Armenian school dictionary on the principles of information science and computer technology.

Not only staff members of our institute, but also scientists and specialists of other organizations are members of the creative collective. We are also planning the enlistment in the collective of students of Yerevan State University and Yerevan Polytechnical Institute and members of the student scientific societies.

The collective is familiarizing itself with the experience of other republics. A staff member of our institute visited the Computer Center of the Siberian Department of the USSR Academy of Sciences, where under the supervision of Academician A.P Yershov the Shkolnitsa system, the first in the country, was developed. By means of it the school children of the Novosibirsk Academy Campus for many years have been studying the principles of computer programming.

In cooperation with pedagogy scholars it is planned to develop and introduce in the Armenian school diverse game and teaching programs on various subjects, including programs which teach programming language, testing (evaluation), tutorial, and other programs.

A local computing and data processing network, on the basis of which the Shkola Automated Control System will be organized, will be developed and introduced at the base Armenian secondary school.

For the successful solution of the large complicate set of problems of the computerization of education the establishment of the Republic Methods Center for the Study and Generalization of the Experience of the Instruction of Youth in the Principles of Computer Technology should be expedited. At the Exhibition of National Economic Achievements of the Armenian SSR it is advisable to set up a demonstration school computer study center for the dissemination of the gained experience.

The skills of communication with computers, which are penetrating more and more deeply all the sectors of the national economy and the area of human activity, in the not very distant future will become a mandatory feature of the erudition of the Soviet individual.

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AUTOMATION AND INFORMATION POLICY

KAZAKH SCIENTIFIC, TECHNICAL INFORMATION ORGANS

Alma-Ata NARODNOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 12, Dec 85 pp 26-28

[Article by T. Tursunbayev, director of the Kazakh Scientific Research Institute of Scientific and Technical Information and Technical and Economic Research attached to the Kazakh SSR State Planning Committee, and M. Goldman, chief of a department: "Scientific and Technical Information in the Service of Production"]

[Text] The information support of scientific and technical progress is, as is known, an indispensable condition of the development of the economy in the direction of its utmost intensification. The republic scientific and technical information system (RSNTI) is a part of the statewide scientific and technical information system. In Kazakhstan it is represented by intersectorial organs--the Kazakh Scientific Research Institute of Scientific and Technical Information and Technical and Economic Research attached to the Kazakh SSR State Planning Committee (KazNIINTI), 14 oblast territorial centers of scientific and technical information and propaganda (TsNTI's), which work jointly with the Republic Scientific and Technical Library (RNTB) and the same kind of libraries in the oblasts (ONTB's), as well as similar sectorial organizations in the republic ministries and departments and 27 union-republic ministries and departments, which reflects to a certain degree the principle of the combination of the sectorial and territorial planning and management of the national economy.

The tasks of the information support and tracking of both comprehensive goal and other programs of the national economy have been assigned to the structural subdivisions of this system. These subdivisions contribute to the assurance of patentability and the increase of the scientific and technical level and competitive ability of new developments; the analysis and preparation of recommendations on the use in production of effective achievements of science and technology and advanced know-how.

The level of the information service of the republic makes it possible to offer the users of scientific and technical information more than 20 forms and methods of specific services. Among them are the selective dissemination of information (IRI); information-reference service in the "request-response" mode. Moreover, scientific methods work (seminars, the improvement of the skills of information workers, and so forth), thematic selections of

literature, bibliographical lists, and scientific and technical propaganda ("days of the specialist," "days of movie information," tape recordings of lectures of scientists and speeches of production innovators, and others); supply with publications of scientific and technical literature (analytical surveys, annotated lists of innovations, which are recommended for introduction, express information, information leaflets on advanced production know-how); service in an automated mode have also been assigned to the indicated service.

At present about 25,000 enterprises and organizations of Kazakhstan are using the services of the republic scientific and technical information system. The republic territorial organs of scientific and technical information annually issue to subscribers about 16 million information documents and copies of them and send up to 120,000 responses to inquiries.

The differentiated supply of information to executive personnel of party and state organs (DOR) is an important direction of the activity of the KazNIINTI and its intersectorial territorial centers. During the current year more than 500 people, to whom more than 22,000 documents and copies of them are being sent, are being served through this system. The submitted materials are being used for the analysis of the state of and the making of management decisions on various questions of the development of the economy, science, and technology.

Annually the KazNIINTI and the centers of scientific and technical information and propaganda publish more than 20 collections of technical and economic indicators of the development of the sectors of the national economy, more than 30 analytical surveys and approximately the same number of annotated lists of innovations with recommendations on their use, about 100 rapid information reports, and 2,300 information leaflets on advanced production know-how, including 250 by way of intersectorial exchange.

This information helped in 1984 alone to introduce in the national economy of the republic 2,354 innovations with an economic impact in the amount of 10.6 million rubles. In particular, a computer-aided system of the designing of technological processes with an impact of 16,200 rubles was introduced at one of the plants of Petropavlovsk, while a mechanized method of unloading bulk materials from railroad cars with an annual economic impact of 20,000 rubles was introduced at the Alma-Ata Sugar Mill.

While here are other characteristic examples of the significance of the goal-oriented use of scientific and technical information in the national economy. At the fields of Semipalatinsk Oblast on the recommendations of the State Scientific and Technical Information System the new high-yielding strain of spring wheat tselinnaya-21 was introduced with an economic impact of 255,500 rubles. Flotation machines with conical aerators were introduced at the Dzhezkazgan Mining and Metallurgical Combine of the Kazakh SSR Ministry of Nonferrous Metallurgy, which yielded an economic impact of 125,000 rubles.

The scientific and technical information service of the republic is attaching particular importance to the preparation of information materials on questions of the Food, Energy, and other comprehensive goal programs of the country, the

improvement of the methods of management in industry and the agroindustrial complex: the conducting of large-scale economic experiments, the certification of workplaces, work under the new conditions of management, the monitoring of the observance of contractual obligations, the decrease of the use of the proportion of manual labor in production.

In 1984 a bank of information materials on the production of consumer goods in Kazakhstan was created on the initiative of the institute. It includes a card file of goods, technical specifications (passports, drawings for complex items), and the addresses of enterprises. This made it possible (also in the "question--answer" mode) to organize the systematic exchange of advanced know-how among organizations and enterprises. The KazNIINTI has already issued the first part of "the list of consumer goods produced by enterprises of Kazakhstan," which numbers about 900 descriptions of household, cultural, and personal items, and has prepared the second part for publication.

For the purpose of implementing the extensive interrepublic exchange of achievements of science and technology the KazNIINTI and the centers of scientific and technical information and propaganda annually turn over to the corresponding state system information on 15,000 scientific and technical achievements, which have been introduced in Kazakhstan, and receive in exchange similar information on more than 190,000 innovations from other republics.

For providing assistance to enterprises and organizations in the introduction of scientific and technical achievements the KazNIINTI and the centers of scientific and technical information and propaganda are making up collections of design documents (KD's) for nonstandardized equipment. Their size has already been increased to 7,600 documents, which in accordance with the requests of enterprises and organizations are annually sent out to thousands of addresses.

It should be noted that with the changeover of the economy to intensive means of production, the number of achievements in the area of scientific research and experimental design work, which have been introduced in accordance with materials of scientific and technical information, has increased sharply. Their share in the total economic impact in individual ministries and departments comes to 25-30 percent.

The service of the users of scientific and technical information with its changeover to an automated mode has been significantly improved and sped up. The placement into operation of a YeS-1045 high-speed computer with a large main memory and the creation of a special information bank of documents on magnetic tapes (more than 5.7 million units) and on microcarriers (more than 10 million units) contributed to this.

More than 1.2 million documents, which reflect the present level of the development of science and technology in the country and abroad, have been fed into the automated system. Now the subscribers have obtained the opportunity not only to find them and to familiarize themselves with them much more rapidly, but also, as needed, to order copies of original sources.

Now about 6,000 users of information have already been changed over to service in the automated mode, and with each year this number is increasing. In 1984 alone 200,000 descriptions of documents were turned over and 2,500 original sources were sent out in accordance with 9,500 permanent requests.

The acceleration of the methods of the processing, retrieval, and analysis of scientific and technical information is making it possible to intensify and to place at a modern scientific and technical level the very process of its use.

The automated system helped, for example, ministries and departments in the shortest time to study 55 major innovations, which were cited in "The Report on the Most Important Domestic Achievements in the Field of Science, Technology, and Production," and to select the 39 most valuable and promising of them for the inclusion in the sectorial plans of their introduction at enterprises of the republic in 1985.

After the turning over for use of the data and documents of the network of territorial automated centers of scientific and technical information, which is attached to the KazNIINTI, its users from remote user stations via communications channels will also receive access to all the information arrays which are stored in the computer memory.

During the 12th Five-Year Plan in accordance with the model developments of the KazNIINTI the introduction of subsystems of scientific and technical information on the basis of operating sectorial automated control systems in ministries and departments of the republic is envisaged.

The innovations resulting from business trips are finding more and more extensive use at the enterprises of the republic, especially those which are subordinate to the Kazakh SSR Ministry of Power and Electrification, the Kazakh SSR Ministry of the Food Industry, the Kazakh SSR Ministry of Housing and Municipal Services, and the Kazakh SSR Ministry of the Construction Materials Industry.

As an example it is possible to cite the SK-10 units for reactive power compensation in 110 kilovolt electric power networks, which were introduced in accordance with the exchange of know-how at the peak-load electric power plant of Chimkent following the experience of the Uraltyazhmash Plant (the impact is 117,000 rubles). At the Alma-Ata Milk Production Association of the republic Ministry of the Meat and Dairy Industry an additional air heater for the drying of whey, more than
10 million units) contributed to this.

with the materials of the business trip of its specialists to the Moscow Moloko Association (the impact is 59,400 rubles). At the Kazmramor Combine of the Kazakh SSR Ministry of the Construction Materials Industry granite cutting machines were introduced as a result of a business trip to Italy (the impact is 28,000 rubles).

The conferences, seminars, and interplant and interdepartmental schools on various urgent questions of the improvement of production and its retooling, which are held regularly by the KazNIINTI and the centers of scientific and technical information and propaganda, are helping to better adopt and more rapidly disseminate advanced know-how. Thus, at the Chimkent Voskhod Garment

Factory on the recommendation of the republic conference on the theme "The Introduction of Highly Productive Completely Mechanized Lines at Enterprises of Kazshveyprom" such a line for the production of men's suits was introduced (the economic impact is 37,000 rubles).

For the purpose of increasing the efficiency of the work of the scientific and technical information system and enhancing its role in the acceleration of scientific and technical progress the Kazakh SSR State Planning Committee approved "The Statute on the Cooperation of the KazNIINTI, Territorial Centers of Scientific and Technical Information and Propaganda, and the Base Scientific and Technical Information Organs of Ministries and Departments in the Kazakh SSR Republic Scientific and Technical Information System." Cooperation and the division of labor among them and the supply of enterprises and organizations with sectorial information (the departmental scientific and technical information organs) or intersectorial information (the centers of scientific and technical information and propaganda) are being carried out on the basis of this statute.

In development of the above-named statute the KazNIINTI drew up procedural instructions, in conformity with which scientific and technical information organs are performing purposeful work on the increase of the skills of specialists of the system and users of the information and are giving procedural and practical assistance to enterprises and organizations in the performance of information work.

For the improvement of the coordination of this activity the KazNIINTI has concluded contracts on creative cooperation with the central scientific and technical information organs of 12 sectors and is developing cooperation with similar services of other republics.

As the main organization of scientific and technical information organs of Kazakhstan and the republics of Central Asia the KazNIINTI is strengthening contacts with the scientific and technical information organs of the socialist countries. In particular, we are successfully developing cooperation with the center of scientific and technical information of the Mongolian People's Republic, which the institute is helping to organize work and to increase the professional level of specialists.

The KazNIINTI and the centers of scientific and technical information and propaganda are carrying out the tracking of 709 assignments and stages of all-union scientific and technical programs and 7 republic scientific and technical programs, in the implementation of which 188 organizations of the republic are taking part. The identified deviations with respect to the time and amounts of work are reported quarterly to the USSR State Committee for Science and Technology, the republic State Planning Committee, and the oblast committees of the Communist Party of Kazakhstan.

According to the data of the Kazakh SSR Central Statistical Administration, 13,800 innovations, which were borrowed from materials of scientific and technical information with an economic impact in the amount of 77.4 million rubles, were introduced in 1984 in the national economy of the republic, which is 1,200 innovations and 63.6 million rubles more than in 1983.

A significant portion of the innovations introduced in the republic (for the Ministry of Geology--42.8 percent, the Ministry of Land Reclamation and Water Resources--31 percent, the Ministry of the Gas Industry--25 percent, the Ministry of the Construction Materials Industry--24 percent, the Ministry of Nonferrous Metallurgy--32 percent), in addition to the economic impact proper, also have an important social impact--the facilitation of working conditions, the increase of the reliability of the operation of equipment, the improvement of the state of labor safety practices and industrial sanitation.

However, in the work of the technical information organs of Kazakhstan along with definite gains there are also substantial shortcomings. Thus, the introduction of recommendations is frequently dragged out for 3-5 years, which decreases the effectiveness of their use in the national economy. At a number of enterprises a procedure of planning the use of scientific achievements from sources of scientific and technical information has not been established and the accounting and reporting on the use of information materials have been poorly organized. Such a picture, for example, is observed with respect to the Ministry of Light Industry, the Ministry of Power and Electrification, the Ministry of Housing and Municipal Services, and the Ministry of Consumer Services.

The unsatisfactory supply of scientific and technical information organs with duplicating equipment is seriously limiting the possibilities of the prompt supply of subscribers with technical information and is adversely affecting the quality of information documents. Moreover, several oblast scientific and technical information centers and scientific and technical libraries have to work in buildings which are unsuitable for this, for example, in Tselinograd.

It is especially necessary to emphasize that without the proper interest of executives of individual ministries and departments in the information supply of the sectors of the national economy, which have been entrusted to them, it will be difficult to solve the problems in the area of scientific and technical progress. It is necessary already today to remember that scientific and technical information is one of the most important resources of the development of the socialist economy.

7807
CSO: 1814/132

AUTOMATION AND INFORMATION POLICY

PROBLEMS IN PUBLICATION OF SCIENTIFIC, TECHNICAL LITERATURE

Moscow KNIZHNOYE OBOZRENIYE in Russian No 47, 22 Nov 85 p 6

[Article by Candidate of Technical Sciences M. Razmakhnin, editor in chief of the journal ZARUBEZHNAYA RADIOELEKTRONIKA, under the rubric "Science and Technology": "Use All the Possibilities"; first paragraph is KNIZHNOYE OBOZRENIYE introduction]

[Text] Director of the DOSAAF Publishing House S. Isachenko (KNIZHNOYE OBOZRENIYE, 18 October) and the readers V. Gulyayev (KNIZHNOYE OBOZRENIYE, 18 October), V. Spitsnadel (KNIZHNOYE OBOZRENIYE, 8 November), and I. Alekseyeva (KNIZHNOYE OBOZRENIYE, 15 November) have taken part in the discussion which was begun by the reader S. Yaroslavtsev (KNIZHNOYE OBOZRENIYE, 30 August 1985). Today we are publishing the article of Candidate of Technical Sciences M. Razmakhnin.

The editorial office of the newspaper KNIZHNOYE OBOZRENIYE invited its readers to discuss a very important problem. Indeed, the efficient and skilled promotion of the modern achievements of science and technology in our country and in foreign countries can and should serve as a mighty catalyst of scientific and technical progress. Unfortunately, our scientific and technical literature does not always successfully cope with the solution of the problems posed for it, and the individual examples, which were cited in the publications of S. Ashitkov (KNIZHNOYE OBOZRENIYE, No 24, 14 June of this year) and S. Yaroslavtsev, can serve as confirmation of this. Incidentally, nearly every worker of the publishing house, as well as many readers could supplement the list of such poor or obsolete publications, but such criticism of individual publications cannot serve as an effective means of improving the organization of the matter of scientific and technical propaganda. As the article of S. Ashitkov shows, the management personnel of the USSR State Committee for Publishing Houses, Printing Plants, and the Book Trade are elaborating a large number of measures on the increase of the quality of the publications being issued and the shortening of the time of their publication.

I would also like to dwell in greater detail on precisely this last aspect, since the means of increasing the quality of literature have been known for a long time and work is being carried out actively and continuously in this direction. Precisely the time of the publication of original and translated scientific and technical literature is the Achilles' heel of our publishing

houses. At the same time both in our country and abroad there are sufficient examples of the prompt publication of books. The average time of the publication of books and collections of works of conferences, which in size exceed the majority of monographs, in the United States and the countries of Western Europe does not exceed 6 months. Our Mir Publishing House carries out the publication of large translated journals in approximately the same time, while how promptly the books and pamphlets of Politizdat are published!

Hence, it is possible to publish books and pamphlets quickly! What is lacking for the extensive introduction of the available, although very limited experience?

First, there are not enough modern means of rapid printing, duplicating equipment, and complexes for the publication and duplication of materials on the basis of computer technology. How many years we have been seeing at international exhibitions fine models of such equipment and have been reading in newspapers about the development of models of such equipment in our country! But just where are the results of the introduction of these achievements in printing and in publishing activity? In the opinion of specialists, barely a third of the demand for duplicating equipment is being met in our country. It is regretfully necessary to state that the latest equipment has not yet reached the majority of our publishing houses and printing plants. It would be all the more important to disseminate more extensively the experience of the publishing houses, at which enthusiasts of the introduction of electronic systems in publishing are working, for example, the Mir Publishing House.

The shortening of the time of the processing of manuscripts at publishing houses could yield a large impact. It is clear that it is impossible to set forth even briefly in a newspaper article such a complex problem. And still in our times it is impossible to recognize as normal the situation, when in the majority of cases more than a year passes from the moment of arrival of a finished manuscript at the publishing house to its delivery to the printing plant! The editing of the manuscript, its correction, repeated examinations and approvals, editorial preparation, retyping, the copying of formulas, the reading of the manuscript, checking, and other similar processes of the preparation of the manuscript for printing are included in this time. And whereas it is possible to achieve the shortening of the reviewing time or if only its precise observance only with the increase of the responsibility and discipline of the workers of publishing houses, authors, and reviewers, it is possible to achieve the radical shortening of the time of the preparation of already approved manuscripts, having introduced the already available computer-aided text processing systems. But at the scientific and technical publishing house, which is typical even for the capital, either they are not available at all or there are single examples.

But if we even assume that such equipment will suddenly arrive at all publishing houses, this will not yield an immediate impact. The majority of our editors are not trained for work on equipment which has been developed on the basis of computer technology.

Briefly summarizing the above-stated considerations, I want to emphasize once again the vital necessity of the extensive and comprehensive introduction of modern means of the preparation of manuscripts and the publication of books on the basis of computer technology and the instruction of workers of publishing houses in their efficient use. This is a very important reserve in the matter of shortening the time of the publication of scientific and technical books.

So far we have been speaking only about books. But this is not the only channel of the dissemination of topical scientific and technical information. Scientific and technical journals are a very efficient means of the promotion of the achievements of science and advanced technical know-how. In the best of them the time of the publication of articles has been shortened to 3-6 months. So that from this standpoint it seems not to be necessary to lodge complaints against the majority of journals. I would like to say here several words about the quality of the information being published in them and about the form of its delivery.

At present the typical scientific or scientific and technical journal is a collection of a large number of very short notes which cover very narrow, local problems. By virtue of this each of them finds a limited group of readers. Perhaps, the personal biases of the author, who has been working for more than 12 years at the journal, which publishes surveys of Soviet specialists, tell here, but it seems very expedient to group the articles of each issue of the journal according to the principle of thematic closeness and to commission a highly skilled specialist to prepare a survey on these articles. Of course, here it is necessary to observe all the copyrights of the individual authors and to retain all the significant scientific results. But this matter is quite practicable: suffice it to point out, for example, that the majority of scientific conferences and symposiums at present are conducted precisely in accordance with this principle--at the section meetings they hear not each speaker individually, but a survey report, which is prepared and read by one of the recognized and authoritative specialists in this field.

The use of such a principle of making up journal publications would make it possible by shortening the nonessential sections of individual articles (especially the introductory and concluding sections) to publish in each issue a larger amount of significant information. Moreover, such "preliminary processing" of scientific publications will make them interesting and necessary for a broader group of specialists in the given and related fields of knowledge.

In conclusion I would like to dwell on another problem. In our country in lractice such a channel of the dissemination of information as scientific and technical newspapers is not being used. In the United States and other developed capitalist countries several tens of newspapers--from dailies to monthlies--are published on electronics and computer technology alone. Foreign specialists regard them as the most efficient and effective means of reporting to the broadest groups of specialists the latest achievements in these rapidly developing fields of technology. Such newspapers publish extensively information on the latest technical developments and patents and on new models of equipment. Survey and analytical articles, statistical data,

various predictions, and other similar information are also encountered in them.

Soviet specialists greeted with much satisfaction the appearance this year of a prototype of such a newspaper in our country as well. The All-Union "Znaniye" Society began to publish the semimonthly bulletin NTR, PROBLEMY I RESHENIYA. However, the small size, the low periodicity, and the too broad a group of problems, which this publication has to cover, do not make it possible to regard it as a completely formed and effective channel of the dissemination of scientific and technical information. In our opinion, each sector of modern technology should have its own scientific and technical newspaper of large size and high periodicity. The personnel for such newspapers can easily be selected from among the editorial offices of the corresponding scientific and technical journals, while the return from such newspapers or, if you wish, the efficiency of the paper used for them will be incomparably greater than that of the publications now being published. The long-term and abundant foreign experience, which should not be ignored, testifies to this.

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DECIMETER RANGE TELEVISION BROADCASTS IN LENINGRAD

Leningrad VECHERNIY LENINGRAD in Russian 14 Sep 85 p 2

[Interview with A.S. Kozyrev, chief of the Leningrad Lentelepriyem Specialized Installation and Adjustment Administration of the RSFSR Ministry of Consumer Services, by A. Sergeyev under the rubric "A Topical Interview": "The Fifth Television Channel"; place, date, and occasion not given; first four paragraphs are VECHERNIY LENINGRAD introduction]

[Text] The roofs of nearly all the buildings of our city have this element. You have probably guessed that I have in mind television antennas. Do you know how many of them there are in Leningrad? More than 60,000! And each year this number increases significantly. But if you take the entire mass of these components, it turns out that some of them have an "age" of a quarter century and, of course, many antennas are both worn out and obsolete. But nevertheless they still serve people, helping the miracle, the name of which is television, to happen daily in their homes.

The time has come to give a closer look to our antenna system. And the reason for this is very pleasant. The point is that in 1986 the Leningrad Radio and Television Broadcasting Center will be technically ready for broadcasts of the new, fourth television channel. But it will be broadcast in the decimeter wave band, for which our antenna system is not designed.

What might be the way out of this situation?

Televisions, which already have a converter attachment for decimeter waves, with a button or switch marked with the letter "D," are being produced. There are also devices, in which a place is envisaged for such an attachment, which should be series produced. But the overwhelming majority of televisions do not have any of this. And, therefore, it has been decided to carry out the modernization of collective antennas. The necessary converter components will be added to each of them. The Leningrad Lentelepriyem Specialized Installation and Adjustment Administration of the RSFSR Ministry of Consumer Services has just been established in the city for the performance of the immense work which is connected with such modernization. Today I am speaking with A.S. Kozyrev, chief of the new administration:

[Question] When will your subdivisions get down to work?

[Answer] At present we are still in the organizational period. But as of 1 January of next year we should begin the modernization of the antenna system. Since it is large and its technical condition leaves much to be desired, much work indeed lies ahead. We should immediately achieve a very high pace in order in fact to complete in accordance with the plan in 1990 the conversion of all the existing antenna systems. Moreover, this is only a part of the work which we have to perform.

[Question] And what else is there?

[Answer] A decision has also been adopted on the decrease of the total number of antennas, for the "fence" of them on the roofs frequently ruins the appearance of buildings. Therefore, not only the modernization of the antennas, which is connected with the introduction of decimeter waves, but also their consolidation will be carried out. One updated antenna will replace four or five current antennas.

And, moreover, in the future we will also have to solve an even more difficult problem--the elimination of zones of the low-quality reception of television broadcasts.

[Question] This problem probably interests very many people.

[Answer] Yes, very many. At present due to a housing system with a different number of stories and several other factors such zones, in which the picture on television screens has a contoured nature, the contrast is worsened, rippling frequently occurs, the color disappears, and other interferences also occur, make up in all nearly a third of the territory of the city. An especially difficult situation exists in the zones of Prospekt Prosveshcheniya, Prospekt Metallistov, Ulitsa Marshala Zakharova, Ulitsa Marshala Kazakova, Ulitsa Kryukova, Ulitsa Bryantseva, Ulitsa Korablestroiteley, Ulitsa Bryusovskoy, and others.

Large television reception systems with elements of cable transmission will be established for the elimination of these zones. In other words, on the basis of a new generation of antenna equipment, the output of which has been assimilated by the Minsk Gorizont Association, we have to set up special centers, from which cables for the transmission of television channels will be laid to the houses. This will eliminate the occurrence of various interferences and other harmful effects. Each such station will be able to serve from 400 to 10,000 subscribers. The Institute for the Planning of Capital Repair of Apartment Houses in the City of Leningrad will prepare for us the designs of these systems. Depending on the readiness of the design documents and the receipt of equipment the work on their establishment should begin in 1987.

[Question] How is the organizational period going, what difficulties is the collective of the new administration experiencing?

[Answer] There are, of course, many difficulties, and I wish to believe that they are quickly passing ones, which are characteristic precisely of the organizational period. A large organization for the installation, adjustment, renovation, maintenance, and repair of the extensive antenna system and, in the future, for the installation of complex zonal cable systems is being set up in the city. An organization, which should have service sections in each rayon. But so far we do not have the appropriate premises and our own transport. There are many other difficulties, which we are not capable of eliminating independently. We are relying on the effective assistance of city organizations.

Not that much time will pass, and we, having turned on the fifth channel on our televisions, will be able to watch the broadcasts of the new, fourth Leningrad television channel.

7807
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CRITICISM OF STATUTE ON BONUSES FOR PROMOTING INVENTION

Moscow IZOBRETATEL I RATSIONALIZATOR in Russian No 1, Jan 86 pp 4-5

[Article by N. Klimov under the rubric "Problems. Life of the All-Union Society of Inventors and Efficiency Experts": "It Was Smooth on Paper..."; first paragraph is IZOBRETATEL I RATSIONALIZATOR introduction]

[Text] As practical experience shows, the new Statute on the Payment of Bonuses for the Promotion of Invention and Rationalization is evoking serious reproaches on the part of workers of bureaus of efficiency promotion and invention, patent experts, active members of the All-Union Society of Inventors and Efficiency Experts, inventors, and efficiency experts. We continue the discussion of this document (see IZOBRETATEL I RATSIONALIZATOR, No 12, 1984, p 4, "One God and Four Horses).

The Statute on the Payment of Bonuses for the Promotion of Invention and Rationalization (hereinafter the Statute) is called upon to stimulate and give incentives for the development of mass technical creativity in the country.

Not much time has passed since the day of the approval of the new document (1983), but it is quite obvious that in a number of cases no stimulation and provision of incentives are occurring. Rather, it is the other way round--the new Statute is checking, hindering invention and rationalization. It is interfering.

The proof?

The Central Council of the All-Union Society of Inventors and Efficiency Experts studied the practice of applying the Statute locally. The analysis covered 70 enterprises and organizations of 24 regions of the country and the materials of 17 ministries and departments. Moreover, the opinion of patent experts, active members of the All-Union Society of Inventors and Efficiency Experts, inventors, and efficiency experts, which was expressed in letters to the Central Council of the All-Union Society of Inventors and Efficiency Experts and the USSR State Committee for Inventions and Discoveries, as well as in statements at seminars and conferences, was taken into account.

What first of all is conspicuous?

Red tape. Paper work. The new Statute at the majority of enterprises has caused its increase by two- to threefold! The calculation of the amounts of the bonuses in accordance with the form established by the ministry and department began to be accompanied by such an amount of information that the drawing up of the documents became a heavy burden on the far from powerful staffs of workers of bureaus of efficiency promotion and invention. Here is what kind of office work it is necessary to rush through in order to pay the bonus for promotion, for example, at one of the commercial seaports. For each, even minor efficiency proposal it is necessary to draw up a certificate of promotion. The manager of the shop (department, section) and the chief of the department (the representative for invention and efficiency promotion) sign the certificate, then they submit it for approval to the chairman of the trade union committee (the council of the All-Union Society of Inventors and Efficiency Experts), then they get the approval of the manager of the enterprise. But what if there are tens, hundreds of efficiency proposals?

But what is in the certificate? Vitally important information? No, a mass of information, which no one needs and duplicates the content of other documents. Namely (be patient--the workers of the bureaus of efficiency promotion and invention have to go through these points not cursorily, as you are now doing, but to fill in each line): the name of the efficiency proposal; its number; the surnames, names, and patronymics of the promoters; their positions, shops, departments, sections, and so forth; the content of the performed work; the date of the start of the use of the proposal; the economic impact during the 1st year of use; the date and amount of the paid authors' award; finally, the proposed amount of the bonus for promotion.

Is literally all this really urgently needed in order to pay someone a 10-ruble note? Might it be worthwhile to differentiate the official registration of bonuses? For example, the minimum of information (and signatures) for bonuses up to 100 rubles, while for bonuses over 100 rubles with, all right, more thorough registration.

Paragraph 5 of the Statute limits the amount of the bonus to the contributing amount of the paid incentive and author's award. A little latter on the amount, but let us now note this: in order to pay the bonus, it is necessary to know how much the author of the proposal received. It is impossible without this.

Is it easy to find this out? Have all the (let us emphasize this word) VITAL situations been considered? Did they remember when drawing up the document all the ravines, through which in contrast to smooth paper experience workers, production workers, workers of the bureaus of efficiency promotion and invention, and active members of the All-Union Society of Inventors and Efficiency Experts have to go?

Imagine: you found in the literature an invention that your plant needs. You promoted introduction. The saving began to accumulate. Do you want to receive a bonus for promotion? No such luck. The plant would be glad to pay the bonus honestly earned by you, but first it is necessary to find out how much the author received, in order not to violate the Statute and not to pay too much. You live in Murmansk, the author lives in Chita. Correspondence

took place. Whether a long time or a short time, it turned out: the initial introduction of the invention is in Odessa, the Odessa plant should also pay the author's award. There is new correspondence. But the plant, it turns out--is it a rare case?--is clashing with the inventor and refuses completely to pay the award. How much the author will receive and when, is unknown, and in general it is problematic whether he will receive something. You will also have to share completely the fate of the inventor. Until they pay him the author's award, you will not see a kopeck. So you will have to wait for the bonus, and wait well--a year, another, a third.... Science is in agreement with you: do not get involved with borrowed inventions.

But meanwhile we complain: "others'" inventions are introduced poorly, the scale of introduction is small. That is why it is also poorly, that is why it is also small.

I understand the authors of the document: they wanted to avoid the obvious injustice, when frequently the promoters received a bonus for the introduction of an invention or efficiency proposal much earlier than its author and, moreover, it happened, one who works at the same enterprise. And, indeed, they avoided this. And this is fine. But another injustice arose: on one enterprise the sins of another weighed. When the author and promoters work in the same collective, there are no problems. But this is only an exceptional case. If the author is "from outside," the new Statute, without helping him to receive the award, in a trice cut off the bonuses to the promoters....

Here there is also the following thing: it is necessary to pay the bonus for promotion within a 3-month period. If they did not keep within it, they have violated the Statute. The intent, perhaps, is also good. How can one there keep within a quarter, when frequently it also cannot be fit into a year! Of course, the violation of this requirement of the Statute is not a triable case, it does not threaten the administration of the introducing enterprise with remote places, but does a cheerful situation form? The more inventions, especially "others'" inventions, there are used, the greater the chances are of becoming violators. Here is what kind of position the Statute placed the enterprises which do not scorn innovations "from outside"! And it is probably clear without words that the enterprises, which dismiss all "others'" inventions, are not violating the Statute....

Here is what stimulation that is received--stimulation in reverse, with a minus sign. The tacit encouragement of passivity.

Now about the amount of the bonuses.

The bonus, according to the Statute, should not exceed the author's award.

Is such a limitation justified? Is it wise? It has been known for a long time and has been written more than once that the labor intensiveness and capital-output ratio of the development of a technical idea, its elaboration, and the bringing of an innovation up to series production are in a relationship close to 1:10:100. At each stage the labor intensiveness increases by tenfold! And this labor is far from always paid for from the

wage fund. The very introduction of bonuses for promotion already testifies eloquently that innovations are introduced not by the wage alone.

There are a large number of examples, when the practical work on promotion is more complicated and labor-consuming than the theoretical calculations of the authors of proposals. Why is this more difficult and voluminous labor not stimulated accordingly? Why do the authors of the Statute obstinately incite promoters to the introduction of insignificant inventions, which do not require particular labor for assimilation, but also do not yield an appreciable economic and social impact?

The discussion of the bonuses for workers of the staff of ministries, departments, and other management organizations is a special one. The new Statute completely deprived them of bonuses for promotion.

And it is also impossible to agree with this.

The results of invention and efficiency activity in many ways depend on the organizing work of the members of the management staff. And, moreover, let us note, not only those whose official duty it has been made to deal with questions of technical creativity.

How was it earlier, before the new Statute? A staff member of the ministry, who is not directly involved with problems of invention, in accordance with his official duties goes on a business trip to an enterprise in far distant lands, and a colleague comes to him with a request: an important invention is being introduced at that enterprise, look into it, help, give assistance, if we introduce it, there will be a bonus. And whether reluctantly or willingly, the staff member took the commission, looked into it, helped, gave assistance. This labor of his was stimulated--even though later, then, not this minute, not this month, but it was stimulated, it did not come to a bad end. And there were results.

And how is it now, after the Statute. A staff member of the ministry, who is not directly involved with problems of invention, in accordance with his official duties goes on a business trip to an enterprise in far distant lands, and a colleague comes to him with a request: look into it, help, give assistance.... But further the colleague is silent, because there is nothing to say: whether or not we introduce it, the result is the same--all the same there will be no bonus. The person sent on the business trip is no fool, he knows about the new Statute if not everything, then in the area of bonuses for workers of the staff enough to throw up his hands in sympathy: I am sorry, I am up to my neck in my own work, I do not know whether I will fit it into the business trip, and I would be happy to give assistance, but, I am afraid, I will not be able to, will not have time.... And they part empty-handed. But such meetings, if they did exist initially, have now ended: Why ask about free labor? Free labor--it is, after all, as if not very necessary, not mandatory, in any case, it is not in first place, not in sight. And this being so, you yourself understand....

A group of people, which is very important for invention and efficiency promotion, has disappeared from the cohort of promoters. They pushed it

beyond the group of those receiving incentives arbitrarily, without consultation with the community, without discussion with the broad audience of inventors and efficiency experts. And the matter began to suffer.

There are also other features of the new Statute, which are causing difficulties in practical work and reproaches of innovators, the active members of the All-Union Society of Inventors and Efficiency Experts, and promoters. But enough. Even without the further increase of the examples the conclusion is obvious: the new Statute needs without delay new correction. It is difficult to accomplish the scientific and technical tasks of the 12th Five-Year Plan with such a document.

From the editorial office: And what do you personally think about the new Statute on the Payment of Bonuses for the Promotion of Invention and Rationalization? Did the author of the article pile it on? Have you had to deal with this standard document? If so, how did events develop? The opinion of the workers of the bureaus of efficiency promotion and invention, the active members of the All-Union Society of Inventors and Efficiency Experts, and, of course, promoters especially interests us. IZOBRETATEL I RATSIONALIZATOR is prepared to continue the discussion of this theme.

7807
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DEPARTMENTAL DISPUTE OVER ISOOPTICAL THERMOMETRY CONTINUES

Moscow IZVESTIYA in Russian 30 Dec 85 p 3

[Article by IZVESTIYA special correspondent I. Dementyeva under the rubric "Returning to What Has Been Published": "The Method of Denial"]

[Text] The report "The Method," which was published in August in IZVESTIYA (No 230), was provided with the subtitle "How Scientific Developments Are Perishing in Nonscientific Disputes." It was related in it that at one of the scientific research institutes a new isooptical remote method of the heat monitoring of equipment was invented; they gave the inventors incentives and held them up as an example, but then suddenly halted the work and the developers were left without work--they fired M. Chernyakova and prevented Yu. Voytsekhov by every means from defending his dissertation.

The question was raised: "Why? Why is a method of hindrance found for nearly every method of acceleration? Why do 'local' inconveniences, which are connected with the operational development and introduction of a new development, various personal and arrogant motives, which have been added to the conflict, gain the upper hand over a competent opinion, common sense, economic expedience, the interests of science and, in the end, over state interests?"

Since the day of publication 4 months have passed. On the instructions of the USSR Council of Ministers the USSR State Committee for Science and Technology (GKNT) collected the opinions on the isooptical method of the most prominent specialists in the field of physical methods of the monitoring of equipment and instrument making.

Among them is the Institute of General Physics of the USSR Academy of Sciences bearing the signature of the director, A.M. Prokhorov, academician-secretary of the General Physics and Astronomy Department and Nobel Prize winner:

"The development of this method for the remote monitoring of objects of radio electronics and electronics is expedient. The Institute of General Physics is prepared to give the necessary procedural assistance in this direction, as well as to participate in joint work."

Let us also cite a second opinion of the USSR Academy of Sciences, that of Corresponding Member of the Academy of Sciences V.L. Talroze, chairman of the academic council for scientific instrument making, who notes that "the great noise immunity of isooptical measuring devices, the remotability and reliability of the monitoring of objects, which operate under a high electric voltage, under the conditions of ionizing radiation, make the isooptical method promising for the heat monitoring of objects in various fields of science and technology, including radio electronics." In the opinion of the USSR Academy of Sciences, "the development of the method of isooptical thermometry undoubtedly must be continued. And normal conditions for the performance of work in this direction should be made available to Comrade Chernyakova, as the basic developer of the method." In the cover letter to the USSR State Committee for Science and Technology of Vice President of the USSR Academy of Sciences Academician Ye.P. Velikhov there is the line: "I agree with the content of the opinion."

"As a whole, in the opinion of specialists," it is stated in the official letter of the USSR State Committee for Science and Technology to IZVESTIYA, "the method can undergo further development and practical application." Hence the Committee for Science and Technology draws a second time the conclusion (it came to this conviction the first time in February 1985) that the work on the further study and improvement of the isooptical method should be continued.

In specifying where isooptics is to be continued, the State Committee for Science and Technology dwelt on one of the higher educational institutions of the Ukraine, where it is proposed to establish such a laboratory.

A department also responded. An official response to the statement of IZVESTIYA came from the ministry. It is impossible to publish it: the total length of the response with the "appendix" is 15 typed pages. The authors of the response--the first deputy minister and the chief of the main technical administration--regard the conclusions of the article "about the existence at the institute and in the sector of a method of hindering scientific and technical progress and a method of destroying scientific development and about the persecution of inventors" to be incorrect ones, which lead to "an incorrect understanding of the essence of the conflict," and declare "the positive attitude as a whole of the ministry toward the isooptical method."

Is it a denial? That is not entirely the case. Rather, we are dealing with a complex, synthetic genre. At first there is complete agreement with the newspaper: "The article raises an important question...," "the question was correctly raised...," "the author of the article correctly notes...." Further it turns out that in the article "deliberately or as a result of the superficial analysis of the conflict many facts either were distorted or do not correspond to reality." At the end of the official response, as usual, they talk about the taken steps: "The article was examined and discussed with the elaboration of specific steps on the elimination of the shortcomings" (although if "the facts are distorted," while "the conclusions are erroneous," for what did they elaborate "measures" here?).

And still let us believe that this is not a purely literary expression, that specific steps actually were "elaborated." What kind?

Is it perhaps said in what state the development of isooptical equipment now is, in what plans it has been included, whether cooperation on its production has been restored, how they dealt with the available reserve?

There is not a word about this.

What is the matter with the inventors? Has the collective of developers been restored?

Not a word.

Has the development perhaps already been turned over to another institute, has financing been open, has the collective of specialists been transferred?

No.

Have the officials, who are responsible for the destruction of the scientific development and the persecution of the inventors, been punished?

There is also not a word about this.

So what kind of shortcomings were eliminated and what kind of measures were elaborated? Here, it turns out, are what kind.

They recalculated the anticipated economic impact from the introduction of isooptics, and it turned out: instead of a profit of 5 million rubles, there is a loss of 400,000 rubles. But the initial figure, which was included in the technical assignment, did not arouse doubts, it was checked several times, the leading specialists of the institute and the main administration signed it. When did they recalculate it? After the article in IZVESTIYA, when the meaning and essence of such "specific measures" can have only one goal--to declare the inventions as not having taken place, to find means to compromise the idea, the technical implementation, and the authors.

The department has means for this. When pilot experimental development is suddenly halted, tests are not concluded, technical specifications do not come out, it is difficult for an innovation to defend itself. But was there a method? Was there perhaps also no method?

Of course, if competent organizations believed that they are dealing with a "soap bubble," this would greatly simplify the matter and would strengthen the position of the main administration. In a letter to IZVESTIYA V.A. Prokhorov, the former chief designer of the isooptical development, called his theme a "soap bubble." (Let us recall: they appointed as the chief designer precisely the person, about whom it was known that he is a fierce opponent of the method of isooptical thermometry). He hinted transparently that the scientific and engineering energy of Chernyakova was aimed at undermining our economic might, since it diverts asserts from his, Prokhorov's, truly valuable work. The letter to the editorial office was signed as follows: "Candidate

of Physical Mathematical Sciences, Honored Radio Operator of the USSR, Member of the NTS (scientific and technical council of the institute--editor's note), Chief of the Scientific Research Department...."

Of course, in the ministry they are not about to support officially the revelations of the "member of the NTS and so on and so forth." Officially the department is full of optimism and benevolence, it is confident that the isooptical method will find application...somewhere there, in the national economy. The method is good, only not in their sector.

But the editorial office of the newspaper did not take upon itself and is not taking upon itself the task of determining the area of application of one technical innovation or another, relying entirely in this on the opinions of competent specialists. We are interested that in the resolution of such conflicts not immediate departmental, but state interests would prevail. Is the method good, but "not for us"? No. If it is good, it is for us. For the country. For the state.

We believe that the ministry is also clinging so to this last argument of its only because this argument, in its opinion, should today reconcile everyone and eliminate all conflicts. They had it prepared for themselves, and it was not useful. Whoever needs to, take it and deal with it. That is, the department is willing to love the method platonically, at a distance. And it wishes that they would finally understand all this.

We would also be glad to understand, for the department has been maintaining an approving tone for a short time. While admitting that the newspaper is right in the "historical," so to speak, sense, the ministry would like to dispute only the facts which concern it, the ministry.

Here one should return to the methods of denial. "The distortions of facts and the erroneousness of the conclusions of the author of the article," it was stated in the official response of the ministry, "were noted by the commission of the city committee of the Communist Party of the Ukraine, which worked at the institute on the verification of the facts presented in the article." The editorial office received an official letter bearing the signature of the secretary of the city party committee. There are there no words which are even close to "the distortion of facts" and "the erroneousness of the conclusions." It was necessary to turn to the ministry for clarifications. The response was stunning: these categorical formulas were composed by it, the ministry, "integrally"! How should this be understood when translated into Russian?

For the sake of fairness let us note that in the report there are also correct remarks. Indeed, M. Chernyakova was appointed chief designer of the development not by an order of the minister, but by an order of the director of the institute on the basis of an order of the minister. Indeed, the industrial section for the production of isooptical sensors was not specified legally and was formally regarded as a pilot section which had nevertheless been prepared for the production of sensors for the supply of the sector. But as a whole the report is an attempt to "differentiate" the article "The Method" and to drown its point in "infinitesimal" denials.

From the departmental report: "...on the personal consent of Comrade Yu.R. Voytsekhov he was appointed to the position of chief engineer."

From the statement of Yu.R. Voytsekhov addressed to the director of the institute: "I have worked at the institute for 23 years, I am not indifferent to its future. In this connection under the threat of dismissal I request that I be transferred to the position of chief engineer."

The incident with the defense by Yu.R. Voytsekhov of his candidate dissertation, which was related in the article, was chastely called in the response "the inconsistency of the actions of the administration." But in the article "The Method" it was a question not of "inconsistency," but of the consistent, conscious, and systematic persecution of the dissertation writer. These are different things. Only the fundamental position, which was taken by the scientific council of the Leningrad Institute of Precision Mechanics and Optics and the expert council of the USSR Higher Certification Commission, despite the 2 years of efforts of the institute and the main administration, enabled justice to triumph: in October of this year they finally confirmed Yu. Voytsekhov for the degree of candidate of technical sciences.

From the departmental report: "M.M. Chernyakova was dismissed for incompatibility with the held position, and not unsuitability of skills" (as was stated in the article--editor's note).

But according to the Labor Code, the detected incompatibility with the held position or previously performed job as a consequence of inadequate skill or the state of health can serve as grounds for dismissal on the initiative of the administration. The health of M.M. Chernyakova is normal. Does it remain?... It is much more difficult to answer the question: How could it have happened that M. Chernyakova, who graduated from 2 higher educational institutions, has the diplomas of a physicist and radio engineer, is a candidate of technical sciences, has written more than 100 scientific works, and has received 80 certificates of authorship for inventions, turned out after 24 years of successful work at the scientific research institute to be "unsuitable with respect to skills" or "incompatible with the position"?

The ministry, having taken at one time in the conflict the side of the institute, was forced to support it unconditionally. In the official response the editorial office is given to understand that the institute is on the upgrade.

In their responses to the article "The Method" the staff members of the scientific research institute, on the contrary, express dissatisfaction with the state of affairs at the institute. They speak about the uncreative atmosphere, which does not correspond to the spirit of the times, the lack of punishment of the director, who divided the collective into welcome and unwelcome people, and the lack of principles and incompetence of the scientific and technical council, the mutually exclusive decisions of which have a harmful effect on the fate of people and developments. These and other letters were signed with their own names, we are deliberately omitting them. The last conversation in the main administration, when its executives A.V. Yakovlev and Ye.P. Pashkevich also significantly "informed" the correspondent

that at the institute 28 allies of Chernyakova and Voytsekhov had already been "identified," is memorable. It is necessary to understand why they "identified" them.

But meanwhile the English have patented isooptical fiber sensors. Is there a Soviet analogue? Yes, one that is 16 years old (M. Chernyakova, Certificate of Authorship No 253408, 1969). Chernyakova, imagine, also reported this to us. Now it is obvious to everyone--she invented not a "soap bubble."

It is necessary to repeat what we already wrote before: "We are purchasing abroad equipment for the monitoring of heat fields, while instruments, which, in the opinion of competent people, not only are comparable to, but in some way surpass imported ones, have been invented in our country. They are many fold less expensive, and they are ours. We could sell them ourselves to other countries, but instead are closing down the theme, are curtailing nearly ready production, and are getting rid of the inventors."

Here we have also returned to the main question which was posed in the article "The Method": the organization of science according to the sectorial principle needs substantial adjustment. Until the interdepartmental arbiters of the USSR State Committee for Science and Technology and the USSR Academy of Sciences back their advisory rights with real possibilities, until then the department will remain the autocratic master over the fate of an innovation, over the fate and reputation of a talented person. It remains to speak about the personal responsibility of the official for what is happening.

In the popular concept "departmentalism" a certain "trace of generosity" is nevertheless assumed--they still look after not themselves, the department. But the structure of a large ministry is such that the solution of one problem or another for years is confined to two or three workers: they both decide fates and write responses to instances. As a result on each document and on each file there is the stamp of not so much the department as the personality of the agent, his personal interest in the case, and personal morality. In practice the competition of ideas frequently turns into the competition of people, who are endowed not so much with an idea as with power and the ability to get out of any situation.

A year and a half have passed since the putting of an end to the only isooptical development in the country. M. Chernyakova as before does not have a job. Candidate of Technical Sciences Yu. Voytsekhov due to "the inconsistency of the actions of the administration" has again been given such a reference that he not only was not confirmed in a scientific position, but barely passed the certification for the position of chief engineer. As before no one is engaged in the development of isooptical thermometry.

Thus, everyone is for.

The Academy of Sciences is for.

The USSR State Committee for Science and Technology is for.

Even the ministry as "a whole" is for.

It is time to change over to methods of solution.

What is holding up the matter?

The matter. Only the matter.

7807
CSO: 1814/120

ELECTRONIC, PHYSICAL METHODS OF MEDICAL DIAGNOSIS

Moscow IZVESTIYA in Russian 29 Dec 85 p 9

[Article by IZVESTIYA science commentator B. Konovalov under the rubric "The Science Club of IZVESTIYA": "Man Through the Eyes of Physics"; first paragraph is IZVESTIYA introduction]

[Text] Looking at ourselves and others in a mirror, we see a clearly outlined figure of a person. But this, it turns out, is not the entire person, but only a part of him. It can be said that this is the known man. But there is also "homo incognito"--the unknown man, who has to be studied. In much the same way as an atmosphere, magnetosphere, clouds of charged particles, and outgoing flows of electromagnetic radiations exist around our plant, a person has this substance, which is invisible to the unaided eye, but is quite material. Its dynamics is a manifestation of our vital activity. And if information on their state is encoded in the radiations of planets, stars, and galaxies, it exists in exactly the same way in the radiations which come from living objects. Man is a living universe, a poet said. And, it turns out, the same methods of study are applicable to us as to the boundless universe.

This idea was made the basis of a new scientific trend of the Institute of Radio Engineering and Electronics (IRE) [Institut radiotekhniki i elektroniki AN SSSR] of the USSR Academy of Sciences, which is now forming under the supervision of Academician Yu.V. Gulyayev. Here they decided to use for studying man the electronic methods of obtaining information on remote objects from their self-radiation.

It is necessary to note that the new scientific trend originated not at "a bare spot." Research of this sort was conducted and is also being conducted now by other groups of scientists. At the Institute of Radio Engineering and Electronics they placed this work on a planned basis and organized a special laboratory of electronic methods of the study of biological objects. Doctor of Physical Mathematical Sciences E.E. Godik was in charge of it.

In order to get to know "homo incognito," they are building here special research chambers, in which it is possible to study as if a separate "tune" of the self-radiations of man. By changing the tuning of a radio receiver, you hear first one, then another station, and each wave bears its own information. The process of studying man has now been organized in exactly the same way at

the new laboratory, which has been located on the first floor of an old mercantile house on one of the side streets of the center of Moscow. A unique frame cage hangs in the largest hall.

"Inside there is as if a magnetic vacuum," Laboratory Director E.E. Godik explains to me, "a special electromagnetic system compensates for the effect of the magnetic field of the earth. In this space we can register man's own magnetic fields, which are millions of fold weaker than the 'background' which is created by our planet. Man is a unique electrochemical generator, in which currents emerge and, therefore, electromagnetic fields continuously originate. This occurs, for example, when an excitation wave passes through the heart muscle--the myocardium...."

You and I have become accustomed to the fact that if the "motor" begins to pink a little, medical personnel take an electrocardiogram. It turns out that contactless magnetograms can give more valuable information than electrocardiograms. It is easier by means of magnetocardiograms to localize the sites of damages, and this is very attractive to medical personnel. Physicists have begun to work with the All-Union Cardiological Center. Now tens of people--healthy people and people with various diseases--have already been examined. Magnetic charts make it possible to see what is happening at the given moment in the heart. This method has a great future.

In the laboratory there is also a chamber which is reliably shielded against extraneous radio waves. Each of us, it turns out, is a radio transmitting station, but a very weak one. Nevertheless reception is quite possible, and it is carried out in this chamber. This in principle differs in no way from passive radio astronomy, which studies planets through their self-radiation. In the shielded chamber a radiometer, which picks up thermal radiation not from the surface of the skin, but from the depth of the body, makes it possible literally in seconds to find out the internal temperature of a person. This is important in order to learn the answer in the mode: sick--healthy. It is also possible to obtain more detailed information in the microwave range of radio waves. The longer the wavelength is, from a greater depth of the body it comes. By making measurements simultaneously at several lengths of radio waves, it is possible to identify the distribution of temperature with respect to the depth of the human body. This gives information on the state of internal organs.

In school in physics classes we became familiar with what is called "a Faraday cup." If you ground a metal screen, extraneous electric fields will not penetrate into it. At the Institute of Radio Engineering and Electronics a large Faraday cup, and more precisely a cell, is being used for studying man by means of sensors of an electric field. The horny layer of each square centimeter of our skin, it turns out, has enormous resistance of 1-10 billion ohms--as good electrical insulation. Therefore, an electric change, which develops on the skin even from friction, discharges very slowly inside to the highly conductive tissues. The sensor of an electric field, which reacts to a change of the distance from it to the charged surface of the skin, as it turned out, can sense the "seismicity" of our thorax during breathing. On this basis a stand for studying the breathing of children has already been developed for one of the clinics..pa

The heartbeat also reverberates in the thorax, and it is possible to make a contactless cardiogram. This is valuable, because often it is necessary to monitor a patient during the day, without disturbing him. The sensors of an electric field also sense at a distance a microtremor--the quivering of muscles, and thus report whether a person is in a normal or tense state. This affords the opportunity by means of instruments to keep track remotely the emotional state of a person, which is important in some situations.

I open the door to the next chamber--it is dark. When the door slams shut, it is darker than the darkest night. It is a frightening sensation. The chemiluminescence of the human body is studied under such conditions. Physicists observed subjects by means of instruments which are capable of detecting even individual light quanta--photons. Yes, indeed, the skin of man glows weakly. The intensity and distribution of luminosity over the body depends on its state. Tumors glow differently than normal tissues, and this can serve medical diagnosis. From the luminosity of the skin it is possible to determine the degree of its injury in case of burns.

Man, just as a planet, has an "atmosphere" which is formed by the products of his vital activity, which escape through the skin in trace amounts. Indeed, these are not simple measurements--it is necessary to keep track of "impurities," which amount to 10-100 molecules in a cubic centimeter. Lasers are used for this. In essence, the same lidars, by means of which contaminants in the earth's atmosphere are studied, but which have been adapted to the study of man, are used.

Traditional physiology is not very ready to accept such methods. For the present physicists and physiologists are still speaking different languages. But progressive people will be found. And with time a common language will be developed without fail.

The language of physics today is first of all the language of computers. All experimental installations have been completely automated. Rapid computer-aided digital data processing is enabling physicists to obtain images of man, which are created by his own fields. And in so doing to succeed in keeping track of their variability.

Conventional medicine is concerned with man only when he is sick. Space and atomic medicine, which are furnished with good equipment, are concerned with man when he is under extreme conditions. But physicists have now engaged in the study of man under ordinary conditions. The methods, which they are developing, will enable us with time in a few minutes to make an examination, without intruding into the body with X-ray photography or other radioactive and rather harmful methods. After the processing on a computer of the data on the self-radiations of a person it will be possible to detect immediately the onset of threatening phenomena and to take the necessary steps. While if everything is normal, it will then be possible to rejoice in life and to work with easy of mind.

In the next room they invite me to put my hand of the table and aim at it a television receiver which resembles a television camera. Only here they first pour liquid nitrogen into one of the openings of the device in order to cool

the sensitive receiver. This device picks up the thermal--infrared--radiation of man. Each of us is a quite decent "furnace" and continuously radiates more than 100 watts. This has been known for a long time. Television receivers are being used both in our country and abroad, but all of them take static pictures. This is in essence thermal photography. But in the laboratory of the Institute of Radio Engineering and Electronics they made a thermal television. This innovation afforded new possibilities of obtaining information on the human body. The principle is approximately the same as in case of citrafern filming, when they shoot individual frames, say, of the growth of a plant, and then as a result of them it is possible to make a movie and to quickly examine the entire process.

On the display screen my hand shines with all the colors of the rainbow. The colors are arbitrary--they reflect the temperature. Where red is, it is hottest of all. The picture first turns red, then turns blue, depicting influxes of blood. The veins and vessels show through clearly.

The researcher, by pushing a button, aims a small white square at the tip of my middle finger on the display screen. The computer make it possible to study immediately the picture of the change of temperature at this point. It turned out that it is quite simple--a type of sinusoid and depicts the activity...of the brain--its center of temperature control. This is a kind of "encephalogram."

By means of thermal television for the first time in the world the dynamic processes, which occur in the cortex of the brain of animals, have already been made visible on a real time scale without opening the skull. It was traced how various types of actions--visual, auditory, medicinally induced--influence these processes. Autowaves, which originate in the brain in case of some actions, were registered. This work is being performed jointly with scientists of the Institute of Higher Nervous Activity and Neurophysiology of the USSR Academy of Sciences.

Each person is a transmitter of electromagnetic rays. Medical personnel have already realized this and are beginning to understand what horizons are opening up in the new direction of knowledge. More than 10 medical organizations are already cooperating with the physicists. And each day the rings of new visitors are heard at the door of the old mansion. Without exaggeration, the laboratory has become a "mecca" for medical personnel and physiologists. And the physicists are generously sharing their knowledge.

For the present the laboratory is small. In the overwhelming majority these are recent graduates and students of the Moscow Physical Technical Institute. The wage of the young people is small. While the director of the laboratory complains: "You will not drive people home at 11 o'clock in the evening, when the doors are supposed to be locked."

Seven channels of research have been outlined for today--the study of electric fields, magnetic fields, the thermal radio radiation of internal organs, the infrared radiation from the surface of the body, the optical chemiluminescence of people, acoustic signals, as well as the change of the chemical composition of man's environment. Each of these "colors" of the human rainbow bears the

most important information. While at present a research chamber, in which these channels will become one owing to unique thorough isolation from the external world, is now being created in the laboratory.

Know thyself, the ancients said. This appeal has not lost its topicality, and it is addressed not only to each person, but also to our entire human race and to all the might of modern science.

7807
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PATENTS AND INVENTIONS

ROLE OF PATENT RESEARCH IN SCIENCE, NATIONAL ECONOMY

Baku BAKINSKIY RABOCHIY in Russian 27 Dec 85 p 2

[Article by Candidate of Technical Sciences V. Bekhbudov, chief of the Baku Affiliate of the All-Union Center of Patent Services of the USSR State Committee for Inventions and Discoveries, under the rubric "The Policy Is Technical Progress": "In Accordance With World Standards"; capitalized passages published in boldface]

[Text] All inventions and all innovations being introduced in production--plans, designs, and technologies--should have patent cleanness and be (there is such a term) patentable. This provision is well-known. But, unfortunately, they frequently confine themselves to it alone, when it is a question of patent and license work at the corresponding centers and services, keeping in mind that they have only control functions, that is, they are concerned with the checking of the obtained results of the scientific search for new equipment and technology. However, the field of patent research is significantly broader, and now the task is being posed to increase sharply its role both in science and in the national economy. I would like to dwell in more detail on this.

The party has posed for every labor collective the task: to ensure the changeover to an economy of the greatest organization and efficiency. In the draft of the new version of the CPSU Program it is noted: "The Soviet product should embody the latest achievements of scientific thought, meet the highest technical, economic, aesthetic, and other consumer requirements, and be competitive on the world market." The achievement of such levels without accurate knowledge and appraisals of world experience, of course, is impossible. They are in principle important in the entire process of the creation of an innovation--from the planning of development and the conducting of research to the embodiment of their results. And at all stages patent experts should give effective assistance to the developers of new products. The main content of their work lies in this. I will note that patent research is assigned to the patent services of scientific research institutes and design and technological organizations, as well as to the cost accounting centers of patent services. The practical tasks are also obvious: one should be concerned about highly skilled staffs of patent experts and ensure lasting relations between them and scientific institutions, enterprises, and associations. First of all, of course, it is important that the executives of

all the units of the national economy and scientific organizations would have a clear idea of the importance of patent research.

Its increased role in recent times was emphasized by the effect of the new state standard--GOST. The procedure of patent research is confirmed in it. The state standard is called upon to increase the responsibility of industrial enterprises, sectorial institutes, and design and technological bureaus for the quality of patent research. But the main thing is that it envisages great responsibility for the level of the equipment and technology being developed.

It is worth noting that in the leading industrial and scientific collectives of the republic the role of the new GOST has already had an effect. It is evident in the development of deep-water stationary platforms, instruments and devices for studies of natural resources from space, and more advanced household appliances--refrigerators, air conditioners, and other industrial products.

But at a number of enterprises of industry and at a number of scientific institutions reorganization is still proceeding slowly. In the work of several sectors of industry there are miscalculations, which were discussed at the conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress, it has not been possible to carry out here radical renovation. Ineffective technological approaches are frequently incorporated already in the designs, it was emphasized at the conference. Due to this a significant portion is returned annually for reprocessing, the construction periods are being dragged out, as a result of which even the best designs are becoming hopelessly obsolete.

All these are serious problems, in particular, for a number of enterprises of petroleum machine building and light industry of the republic. Whether it would be possible to organize here the output of products which conform to world standards, depends on their solution. There are also other reasons, for which the introduction of competitive new equipment and advanced technology is being checked. For example, long-term research and development are not being brought to an end, promising innovations such as the assimilation of the output of flexible hoses, several technologies of petroleum refining, and others are not being put on stream.

Let me recall that the active participation of patent experts is necessary already during the planning of developments. Unfortunately, several scientific institutions propose to include in the plans of the 12th Five-Year Plan with respect to the section of new equipment and technology such themes, in which the goal of achieving and exceeding the world standards is not posed. These miscalculations are characteristic of a number of scientific research, design, and technological organizations, which are subordinate to the ministries of motor transport, consumer services, and local industry. Work on minor themes and the local nature and minor significance of the questions, at which the efforts of researchers are aimed, have been noted at the institutes of soil science and agrochemistry, genetics and selection, animal husbandry, veterinary science, and several others. The statement of the questions is already such, that it is not worth expecting high end results, that one does not have occasion to speak about a turn toward intensification

and quality. All this, beyond doubt, is a consequence of the low level of patent research. At the sectorial institutes and subdivisions of the republic Academy of Sciences, which were spoken about, either it is being conducted superficially or they are not concerned about it at all.

Now we have to achieve a fundamentally new approach to research and planning and design development. The level of invention, which should distinguish the technical decisions in all sectors of the national economy and in all spheres of social development, is becoming their criterion.

It seems that the increase of the level of patent research and strict responsibility for its conducting should be envisaged in the new version of the CPSU Program. And I would like to see the corresponding line of Section II of the draft in the following wording: "THE PARTY WILL PROMOTE IN EVERY POSSIBLE WAY THE FURTHER INCREASE AND EFFICIENT USE OF THE SCIENTIFIC AND TECHNICAL POTENTIAL OF THE COUNTRY AND THE DEVELOPMENT OF SCIENTIFIC RESEARCH, WHICH AFFORDS NEW POSSIBILITIES OF MAJOR REVOLUTIONARY CHANGES IN THE INTENSIFICATION OF THE ECONOMY AND ENSURES THE GREAT PATENTABILITY OF INNOVATIONS AND PLANNING AND DESIGN DEVELOPMENTS."

7807
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FEDERATION OF SCIENTIFIC, TECHNICAL SOCIETIES

Moscow PRAVDA in Russian 18 Nov 85 p 4

[Article by S. Baygarov under the rubric "At Your Request": "What Is FeNTO?"; first paragraph is PRAVDA introduction]

[Text] Engineer G. Spirin of Moscow addressed to PRAVDA the question of how the cooperation of the scientific and technical societies of the CEMA member countries is developing.

The Federation of Scientific and Technical Societies unites the scientific and technical societies of seven socialist countries: Bulgaria, Hungary, Vietnam, the GDR, Poland, the Soviet Union, and Czechoslovakia. Its basic goal, as is recorded in the charter of the organization, is the aiding of the strengthening of the role of scientific and technical organizations in the planned development of science and technology and the acceleration of the use of their results in production. The FeNTO is also performing much work on the increase of the level of knowledge, the skills, and the creative activeness of engineers, scientists, and leading workers.

The federation has established close contacts with the CEMA Committee for Scientific and Technical Cooperation and other organs of the council. The FeNTO is participating in the drawing up of forecasts on various directions of the development of science and technology and is acting as a public consultant of many CEMA programs. Thus, being public organizations of the fraternal countries, the members of the FeNTO jointly with the committee are actively participating in the preparation of documents of the Council for Mutual Economic Assistance. Thus, for example, an engineer from Saratov, a worker from Kladno, or a technician from Budapest can be involved in the elaboration of important economic questions on the international level. This is a vivid manifestation of socialist democracy in action.

A large role also belongs to the FeNTO in the propaganda support of the adopted decisions. It has good means for this, since the scientific and technical societies, which belong to the federation, have departments at enterprises and institutions.

The FeNTO jointly with the CEMA Committee prepares and holds scientific conferences and seminars on various questions. For example, an international

meeting on problems of the forecasting of scientific and technical progress was recently held in Tbilisi, while a seminar on the determination of the need of the national economy of the CEMA countries for scientists was held in May in Berlin.

The socialist states are coming out in favor of the mutually advantageous international division of labor. This is one of the practicable means of increasing production efficiency. However, it must not be allowed that the economy of the countries of our community would depend on deliveries of western products. This is especially undesirable in the strategically important directions. Therefore, in recent years the federation has engaged in an unusual "inventory": it is examining carefully the technologies and materials, which for the present are still being purchased in the West. It is examining them, of course, not out of simple curiosity. Frequently the federation offers recommendations for the rapid organization of the production of the necessary equipment "at home," within the community. It is characteristic that specialists of Poland, which had personal experience of what the technological "assistance" of several capitalist states is, have acted in recent times as the initiators of many ideas.

7807
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SCIENTIFIC, TECHNICAL PROGRESS IN AGROINDUSTRIAL COMPLEX

Moscow OBSHCHESTVENNYYE NAUKI in Russian No 5, 1985 pp 195-199

[Article by Candidate of Economic Sciences V. Balabanov, scientific secretary of the Scientific Council of the USSR Academy of Sciences for Economic, Social, and Legal Problems of the Agro-industrial Complex: "The Acceleration of Scientific and Technical Progress in the Agro-industrial Complex"]

[Text] The means of increasing the efficiency of the economic mechanism of the agro-industrial complex (APK) of the USSR, the economic and organizational factors of the stimulation of scientific and technical progress (NTP) in this complex at its various levels, the influence of scientific and technical progress on the socioeconomic development of the countryside--such is the group of questions which were discussed at the All-Union Conference "The Improvement of the Planning and Management of Scientific and Technical Progress in the Agro-industrial Complex" (Moscow, December 1984). The Scientific Council of the USSR Academy of Sciences for Economic, Social, and Legal Problems of the Agro-industrial Complex and the Central Board of the Economic Science Society were its organizers.

The conference was opened by the report of Academician of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin (VASKhNIL) V. Tikhonov, chairman of the scientific council, "Methodological Problems of the Economic Mechanism of the Agro-industrial Complex." He noted that the years of the 11th Five-Year Plan are characterized by vigorous, persistent, and purposeful steps, which are being taken by the CPSU Central Committee and the Soviet Government on the acceleration of the development of the agro-industrial complex of the country. The implementation of the USSR Food Program, which was adopted in 1982, lies in the way of the transition from the extensive type of development of agriculture to the primarily intensive type of reproduction in the agro-industrial complex as a whole. However, quantitative parameters still predominate in the evaluation of the activity of the agro-industrial complex. This frequently leads, for example, to the formation of surpluses of some types of products with a chronic shortage of others.

The prevailing technical policy is appearing directly in the structure of the material base of agriculture, and at the same time also in the structure of agricultural production. The latter cannot be developed other than by adapting to the existing bioclimatic factors of farming. The principles of

adaptation to the bioclimatic characteristics of the nature of agricultural production should be the basis for the modern organization of agro-industrial production. But practical experience shows that farming is forced for the present to adapt not to them, but to the conditions of the production and deliveries of material resources.

The regional structure of farming, which formed to a certain extent as a consequence of the policy of general-purpose farming, is also adversely affecting the efficiency of the development of USSR agriculture. To some degree the slogan of the self-sufficiency of each region in foodstuffs is contributing to the general-purpose nature of the regional structure. In itself this principle does not evoke objections. It is a question of what means of self-sufficiency to select. Modern industrial farming is specialized farming, with extensively developed interregional exchange. Self-sufficiency in foodstuffs on this basis implies the bringing of the production of each type of product as close as possible to regions with the most favorable natural and climatic conditions for it. Precisely specialization is the basis for the successful use of systems of machines, which are called upon to ensure the complete mechanization of agricultural production.

In speaking about the economic interrelations of agriculture and the capital-producing sectors, V. Tikhonov dwelt on the question: Why is the structure of the production of means of production for agriculture separated from the volumes and needs of farming? The reason for this is the historically established monopolism of the producers of material resources in the country and their economic independence from consumers.

At present commodity-money relations, which are oriented toward the increase of the efficiency of social production and toward the ultimate needs, are playing a large role in the economic mechanism of the USSR, in the set of economic relations, and in the combination of the forms and methods of management. Only by using economic methods is it possible to create the conditions, under which the producer of each type of resources will proceed from the interests of the consumer of these resources. Only in this way is it possible to ensure the overall orientation of the national economy toward the ultimate interests of consumers, including the consumers of the products of the agroindustrial complex.

In conclusion V. Tikhonov dwelt on the problem of improving the interrelations of the producers of resources and their consumers on the basis of economic contracts. Here each party should act as a equal party, while the contracts should envisage the equal material liability of the parties for the observance of their terms. It is necessary to guarantee a situation, when the violator of a contract is obliged to cover in full the losses of the party which has suffered. Moreover, the amounts of indemnification can be increased to the amount of the "lost gain."

The improvement of the planning and management of scientific and technical progress in the agroindustrial complex requires a change of investment policy, Vice President of the Ukrainian SSR Academy of Sciences Academician I. Lukinov noted in his report. At present investments are being channeled not so much

into the assurance of a rapid growth rate of production (gross and commodity) as into the offsetting of freed resources.

In talking about the problems of accelerating scientific and technical progress in the agro-industrial complex, the speaker emphasized that, first, it is necessary to shorten the extremely lengthy cycle from the origination of an idea of the development of new equipment to the materialization of this idea. Second, the optimum ratio between investments in the development of basic research and in the direct pilot production and mass assimilation of new equipment should be achieved. At present this ratio instead of the required 1:10 comes to 1.7:1. Finally, it is important to ensure the proper material interest of all the units of the investment process and all the units, which are responsible for the acceleration of scientific and technical progress, in the assurance of a fast pace and the shortening of the time of the assimilation of new equipment. Without the use of the principles of cost accounting it is extremely difficult to achieve success in the development of scientific and technical progress.

The report of Academician of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin V. Mozhin, chairman of the Council for the Study of Productive Forces attached to the USSR State Planning Committee, was devoted to questions of the management of scientific and technical progress in the agro-industrial sphere. Under present conditions the Comprehensive Program of Scientific and Technical Progress of the USSR is the form of the implementation of state scientific and technical policy, which is closest to the specific conditions. At the same time in the matter of using this program for the needs of the management of the agro-industrial complex there are still many methodological and procedural defects. The main one is that the technological system here should not be confined to the framework of agriculture. It is called upon to permeate all the sectors of the agroindustrial complex.

R. Otsason, director of the Institute of Economics of the Estonian SSR Academy of Sciences, in his report substantiated the importance of coordinating the work of all the units of the management of scientific and technical progress in agro-industrial production. Here the enterprise is the most responsible unit. Production and consumption are directly linked precisely at this level. But this connection, if one views the matter in essence, is a form of economic liability for the results of production. Many years of experience testify that if we want to improve the economic mechanism of the agro-industrial complex, comprehensive solutions are necessary. First of all, all the economic forms and methods of management should be interconnected: in case of a change of one of these forms the others should also be changed. Moreover, it is impossible to change the procedure of planning without affecting the methods of stimulation and so on. The speaker told about the experience of Estonia, where a republic agro-industrial association, which includes the enterprises of the Ministry of Agriculture, the Agricultural Equipment Association, and the Committee for Land Reclamation and Water Resources of the republic, has been established.

The report of M. Kozyr and M. Ring (the Institute of State and Law of the USSR Academy of Sciences) was devoted to urgent problems of introducing the

achievements of scientific and technical progress in agricultural production. Although the basic directions of scientific and technical progress are being elaborated in the fund-forming industrial sectors, there for the present there are no unified plans of scientific and technical development for the agro-industrial complex. There is also no unified system of its economic stimulation within the agro-industrial complex itself. All this is posing the problem of the consistent elaboration of a unified direction of scientific and technical progress both for agriculture and for the other sectors which are a part of the agroindustrial complex. Here scientific and technical progress in the capital-producing sectors should be adapted to the basic directions of scientific and technical progress in agriculture. It is also necessary to introduce the principle of an adaptive system of planning in the method of planning and in the procedural instructions on the planning of scientific and technical progress at the level of the state plans of the economic and social development of the USSR and the union republics, the plans of sectors, and so on.

In the report of President of the Moldavian SSR Academy of Sciences and Corresponding Member of the USSR Academy of Sciences A. Zhuchenko "The Theory and Practice of the Adaptive System of the Intensification of Plant Growing" attention was directed to Lenin's well-known methodological principle that in case of the industrialization of agriculture it is impossible to replace the forces of nature completely with human labor. However, the trend, when they attempt actually to replace the forces of nature if not with human labor, then with equipment, fertilizers, and so on, is being observed in the practice of agricultural production. But agricultural production in its essence is unique. Plants provide man with access to unlimited resources of energy: plants live on light and 95 percent of their dry substances are recovered solar energy. Therefore, the technogenic expenditures of energy (equipment, fertilizers, pesticides) in the formation of the crop come in relation to natural energy to 1:4000. Consequently, the idea that by increasing the expenditures of technogenic energy it is possible to increase infinitely the productivity of plants, is untenable. If one species of plants or another in case of regionalization is in a natural zone which is inadequate for it, this species will consume its energy not for the creation of a crop, but for a protective reaction to the unfavorable conditions. This should not be forgotten when intensifying agricultural production.

L. Nikiforov (the Institute of Economics of the USSR Academy of Sciences) devoted his report to the influence of scientific and technical progress on the working and living conditions of workers of the agro-industrial complex of the country. He singled out the trend toward the overcoming of the socioeconomic exclusiveness of the countryside and the destruction of its integrity as a special subsystem in the production and socioeconomic respects. With the development of scientific and technical progress, with the changeover to industrial technological production, and with the development of agro-industrial integration the system of relations between the city and countryside are beginning to change. Agroindustrial production, agro-industrial subdivisions, and the national economic agro-industrial complex are being formed. Thus, the integration of the city and countryside in the most different spheres is occurring, rural-urban subdivisions (production and social) are forming. A common territorial structure, when the region, which

is common in both the production and the social respects, acts as the integral rural-urban subdivision, is emerging. In the opinion of the speaker, the integration of the city and countryside signifies their mutual complementing. This integration should not lead to the disappearance of the village, its transformation into a city, and the decrease of the number of villages.

V. Ostrovskiy, director of the Institute of Socioeconomic Problems of the Agro-industrial Complex of the USSR Academy of Sciences, examined the role of private plots at kolkhozes and sovkhozes, as well as agricultural subsidiary farms of industrial enterprises. Scientific and technical progress is creating new relations between the city and countryside. And here many historically established peculiarities in the division of labor are being lost, the convergence of the production and social infrastructures of the city and countryside is occurring. It is necessary, the speaker noted, to bring the process of production in the countryside close to the sites of the obtaining of raw materials, in order to develop on rural territory a system of the service of the agro-industrial complex, including repair services and small energy-consuming industrial works (individual shops of plants, especially of light industry). And, finally, with allowance made for historical traditions, local conditions, and the availability of manpower resources it is advisable to develop cottage industries in the countryside, to use local construction materials, and so on. Scientific and technical progress is making it possible to use small and medium-sized enterprises efficiently: they conform to the present stage of the changeover to flexible systems and to the production of small series of items.

The sections: "Scientific and Technical Progress in the Agro-industrial Complex," "The Interconnection of Scientific and Technical Progress and the Social Development of the Countryside," "The Legal Regulation of the Introduction of the Achievements of Scientific and Technical Progress in Agriculture and the Agro-industrial Complex as a Whole," worked at the conference.

At the concluding plenary session the conference participants adopted "Recommendations on the Improvement of the Planning and Management of Scientific and Technical Progress in the Agro-industrial Complex," which were submitted to the appropriate central directive organs and organizations for practical use.

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AWARDS AND PRIZES

HONORED INVENTORS, EFFICIENCY EXPERTS OF RSFSR NAMED

Moscow IZOBRETATEL I RATSIONALIZATOR in Russian No 1, Jan 86 p 19

[Untitled, unattributed article]

[Text] The Presidium of the RSFSR Supreme Soviet conferred in the first half of 1985 the honorary titles:

Honored Inventor of the RSFSR

Vladilen Petrovich Lugov--chief of a laboratory attached to the Rostov-on-Don Institute of Agricultural Machine Building, Rostov Oblast.

Isaak Markovich Meyerovich--chief of a laboratory of the All-Union Scientific Research, Planning, and Design Institute of Metallurgical Machine Building, the city of Moscow.

Arsen Sokratovich Melik-Sarkisyanets--chief designer of a department of the Mytishchi Machine Building Plant, Moscow Oblast.

Vladimir Zusevich Pekne--chief of a group of the Uralelektrotyazhmash Production Association imeni V.I. Lenin, Sverdlovsk Oblast.

Lyudmila Mikhaylovna Pestryayeva--chief of a department of the Uralelektrotyazhmash Production Association imeni V.I. Lenin, Sverdlovsk Oblast.

Iosif Andreyevich Potapenko--docent of the Kuban Agricultural Institute, Krasnodar Kray.

Vladimir Pavlovich Pyanykh--chief of a department of the All-Union Scientific Research Institute of Leguminous and Groat Crops, Orel Oblast.

Gennadiy Nikolayevich Timoshinskiy--chief of the Biysk Boiler Plant, Altay Kray.

Emmanuil Sergeyevich Tikhonov--professor of the Ryazan Medical Institute imeni Academician I.P. Pavlov.

Yuriy Andreyevich Frolov--chief of a laboratory of the All-Union Scientific Research Institute of Metallurgical Heat Engineering, Sverdlovsk Oblast.

Gennadiy Vasilyevich Cherepok--chief engineer of the Kuybyshev Metallurgical Plant imeni V.I. Lenin, Kuybyshev Oblast.

Anatoliy Grigoryevich Shanturov--chief of a chair of the Irkutsk Medical Institute.

Fayzrakhman Salakhovich Yunusov--chief of a chair of the Kazan Aviation Institute imeni A.N. Tupolev, the Tatar ASSR.

Honored Efficient Expert of the RSFSR

Vitaliy Yefimovich Alekseyev--fitter of the Vologda Railroad Car Repair Plant imeni M.I. Kalinin.

Vasiliy Nazarovich Bayborodov--electrician of the Bolshevik Mine of the Oblkemerovougol Production Association.

Anatoliy Sidorovich Balabanov--fitter of the sintering factory of the Norilsk Mining and Metallurgical Combine imeni A.P. Zavenyagin of the USSR Ministry of Nonferrous Metallurgy.

Nikolay Vasilyevich Bakhirev--chief engineer of the Biysk Furniture Plant, Altay Kray.

Mikhail Valentinovich Buylenko--senior electrician of the Mineralnyye Vody Division of the North Caucasus Railroad, Stavropol Kray.

Vladimir Konstantinovich Volodin--fitter-engraver of the Perkhushkovskiy Factory of Cultural Goods, Moscow Oblast.

Konstantin Aleksandrovich Govorukhin--leader of a brigade of fitters of Ufa Production Association of Passenger Motor Transport No 1, the Bashkir ASSR.

Ivan Mitrofanovich Gruzdev--chief of a department of the Norilskremmontazh Trust of the Norilsk Mining and Metallurgical Combine imeni A.P. Zavenyagin of the USSR Ministry of Nonferrous Metallurgy.

Vladimir Gavrilovich Grishin--chief of a bureau of the Chelyabinskiy traktornyy zavod imeni V.I. Lenina Production Association.

Ivan Borisovich Danilov--deputy chief of a department of the Volgograd Krasnyy Oktyabr Metallurgical Plant.

Ivan Petrovich Kazachkov--deputy chief engineer of the Barnaul Blend Combine, Altay Kray.

Mikail Ivanovich Kuzmichev--operator of a flaw detector of the Volgograd Krasnyy Oktyabr Metallurgical Plant.

Vladimir Semenovich Kuleshov--deputy chief of a department of the Sevrybkholodflot Administration, Murmansk Oblast.

Anatoliy Fedorovich Kovalev--fitter of the Novoshakhtinsk Garment Production Association, Rostov Oblast.

Aleksandr Timofeyevich Korotkikh--engineer of the Bogdanovich Refractory Plant, Sverdlovsk Oblast.

Petr Alekseyevich Kochnev--superintendent of the administration of the mechanization of construction work of the Irkutskzhilstroy Trust.

Ivan Panteleyevich Kuskov--mechanic-repairman of the Moscow Zarya Shoe Production Association.

Mikhail Fedorovich Larin--electrician-repairman of the Uralelektrotyazhmash Production Association imeni V.I. Lenin, Sverdlovsk Oblast.

Adam Grigoryevich Lopatinskiy--leader of a brigade of electricians of the Verkh-Isetskiy Metallurgical Plant, Sverdlovsk Oblast.

Viktor Mikhaylovich Lytkin--senior design engineer of the Kuznetskiy Metallurgical Combine imeni V.I. Lenin, Kemerovo Oblast.

Viktor Ivanovich Merenger--fitter of the Kuznetskiy Metallurgical Combine imeni V.I. Lenin, Kemerovo Oblast.

Oleg Valentinovich Mukhin--mining foreman of the Kapitalnaya Mine of the Inta Coal Production Association, the Komi ASSR.

Anatoliy Petrovich Nekrasov--senior engineer of the Mine imeni Shevyakov of the Southern Kuznetsk Basin Coal Production Association, Kemerovo Oblast.

Yuriy Aleksandrovich Pavlov--chief mechanical engineer of the Sibiryachka Poultry Factory of Yurginskiy Rayon of Kemerovo Oblast.

Anatoliy Fedorovich Pikalin--engineer-technologist of the Moscow Khromatograph Pilot Plant.

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AWARDS AND PRIZES

WINNERS OF 'TECHNOLOGY IS WHEEL OF PROGRESS' COMPETITION

Moscow IZOBRETATEL I RATSIONALIZATOR in Russian No 1, Jan 86 pp 20-21

[Article: "Technology Is the Wheel of Progress. The Winners of the Competition in 1985 Were: Corresponding Member of the USSR Academy of Sciences R.G. Butenko, Engineer-Machine Tool Builder Yu.M. Yermakov, Shop Foreman G.M. Kartvelishvili"; first eight paragraphs are IZOBRETATEL I RATSIONALIZATOR introduction]

[Text] Last year, on the eve of the All-Union Day of the Inventor and Efficiency Expert, the regular, seventh rewarding of the winners of the competition "Technology Is the Wheel of Progress," which is conducted by our journal, was held. Let us recall that the medal and certificate of the competition were established by the Central Council of the All-Union Society of Inventors and Efficiency Experts and the editorial board of the journal IZOBRETATEL I RATSIONALIZATOR in 1978 in commemoration of the 50th anniversary of our journal for the stimulation of the authors of striking, promising inventions and for the provision of incentives for bold technical developments. The memorial medal and certificate are presented both to prominent inventors and efficiency experts of our countries and to foreign citizens. The obverse of the medal bears a picture of Rodin's The Thinker and the text in Latin and Russian: "He did what he could; whoever can, let him do better." On the back is the inscription: "The Editorial Board of IZOBRETATEL I RATSIONALIZATOR, 1978, Moscow."

We give a list of the winners of past years:

1979: Ye.V. Aleksandrov, V.N. Pikul, P.A. Padchenko, F.M. Fedchenko (IZOBRETATEL I RATSIONALIZATOR, No 10, 1979, pp 18-19)

1980: N.D. Kuznetsov, B.V. Rozanov, I.P. Smirnov, M.F. Shostakovskiy (IZOBRETATEL I RATSIONALIZATOR, No 1, 1981, pp 22-23)

1981: V.A. Belyy, M.A. Zaytsev, M.T. Kalashnikov, S.N. Fedorov, M.T. Tsupikov (IZOBRETATEL I RATSIONALIZATOR, No 1, 1982, pp 16-19)

1982: L.N. Koshkin, K.M. Ragulskis, K.V. Utkin, Z.P. Shulman (IZOBRETATEL I RATSIONALIZATOR, No 1, 1983, pp 4-5)

1983: S.S. Balandin, V.P. Glushko, I.I. Shekhovtsev (IZOBRETATEL I RATSIONALIZATOR, No 1, 1984, pp 20-21)

1984: G.A. Ilizarov, V.V. Fabrikant, G.S. Fedoseyev, innovators of the Polish People's Republic: J. Krowicki, K. Kubiak, F. Sujkowski (IZOBRETATEL I RATSIONALIZATOR, No 1, 1985, pp 6-7)

For the first time in the existence of the competition "Technology Is the Wheel of Progress" a woman has become its winner. This is Corresponding Member of the USSR Academy of Sciences Raisa Georgiyevna Butenko, chief of the laboratory of tissue culture and morphogenesis of the Institute of Plant Physiology of the USSR Academy of Sciences, winner of the Badge of Honor of Order of Labor Red Banner, and State Prize winner.

Raisa Georgiyevna crossed the threshold of the Institute of Plant Physiology for the first time back during the years of the war and since then has covered all the steps of the scientific ladder--from the washing of test tubes to the highest scientific titles. Her work began with the bold suggestion, which was made back a quarter century ago, that a culture of cells of plants retains the capacity for the synthesis of specific biologically active substances. One of the consequences of this hypothesis, which is difficult for nonspecialists to understand, was the following: it is possible to obtain the valuable substances contained in plants not from the plants themselves, but artificially, under laboratory conditions. Confirmation required many years of painstaking work, which was crowned with brilliant success. Ginseng, more precisely the biomass of ginseng, which contains all the most valuable substances of the "root of life," was "grown" for the first time in the world in a test tube. A sensation? Of course, and what a sensation! For wild ginseng achieves maturity only at the age of 20, and on plantations it gains strength in 5-8 years. Therefore, until recently the entire crop of this medicinal plant was used exclusively for producing medicinal compounds.

Now owing to the developments of the laboratory, which R.G. Butenko manages, the unique components of ginseng have been accessible not only to medical personnel, but also to perfumery workers, food industry workers, and representatives of many other sectors of the national economy (IZOBRETATEL I RATSIONALIZATOR, No 10, 1985, p 14).

Raise Georgiyevna has about 20 certificates of authorship. Others followed the first invention. Now microbiologists can grow the cellular biomass of many plants. The bioengineering methods, which were developed by Butenko, are suitable not only for the growing of valuable plants in a test tube. The results obtained by the laboratory in the development of new selection strains of agricultural plants, for example, potatoes, are also no less important. A hybrid of wild and cultivated potatoes, in which the undemandingness and resistance to viruses of wild strains and the taste qualities of their cultivated colleagues are successfully combined, was obtained in the laboratory of Butenko.

The laboratory of R.G. Butenko is performing much other interesting work, so that, we believe, the readers of IZOBRETATEL I RATSIONALIZATOR will again become acquainted more than once with her inventions.

Yuriy Mikhaylovich Yermakov is a candidate of technical sciences, a machine tool builder, and the author of 250 inventions in the most diverse fields of technology; more than 50 inventions have been introduced.

Yermakov explained the breadth of his creative interests by two factors. First, by the fact that he graduated from the Moscow Higher Technical School imeni N.E. Bauman, where he studied, and then worked under the guardianship of remarkable scientists, where the lofty traditions of domestic engineering are maintained and are being multiplied. Second, his narrow specialty itself, metal working and machine tool building, in reality does not have limits, its field of view encompasses all known phenomena, as well as phenomena which have not yet been discovered by science. Yuriy Mikhaylovich once calculated that about 30 physical, chemical, and mechanical parameters of a machine tool, tool, and part are involved in the process of cutting, while the number of possible versions of the interaction of these parameters is 3.8×10^{31}! All machine tools--from the heavy machine tools of the Uralmash Plant to the small-scale machine tools of the "left-hander" N.S. Syadristyy, to the master machine tools for the diamond turning of computer storage disks--have common roots and are distinguished only by the degree of manifestation of one parameter or another.

Now the inventor is dealing with the combination, the "hybridization" of methods of machining, seeing in this inexhaustible reserves of the increase of labor productivity and new advanced technologies. IZOBRETATEL I RATSIONALIZATOR has reported regularly on his work, starting with No 9 for 1972, and will report, we hope, many times more.

During the presentation of the certificate and medal the winner began to speak with unexpected sadness about the past years, about the inexorable shortening of the time allotted to him, and about the thus forced narrowing of the group of most important problems being solved. We believe that given such a reserve of energy it is too early for inventor Yermakov to grieve. It is easy to be convinced that we are correct by having watched the television program "You Can Do This": there Yuriy Mikhaylovich is a member of the panel, one of the most active ones.

Gutusha Mikhaylovich Kartvelishvili is a foreman of the Tbilmyaso Production Association. The readers of IZOBRETATEL I RATSIONALIZATOR probably remember his home-made tractor for the cultivation of private plots, which is capable of performing more than 30 different operations (IZOBRETATEL I RATSIONALIZATOR, No 5, 1980, p 80, "The Best Tractor"). Recently the inventor received certificates of protection for an underground garage (Certificate of Authorship No 1 028 824) and an original hoisting device (Certificate of Authorship No 1 136 987). But he made the most important inventions in his own sector, where he has been working now for nearly 30 years.

We asked Georgian Minister of the Meat and Dairy Industry A.O. Movsesyan to tell about the worker-innovator:

"First a few words about Kartvelishvili the foreman. In 7 years of managing the sector I do not recall criticism of the products of the shop, in which Gutusha Mikhaylovich is in charge of production, and have not once heard a bad

word meant for him. As far as I know, before me this largest subdivision of the association was also always considered successful. It is difficult, believe me, to remain so long at a high level: for our labor is evaluated by an enormous number of consumers and, moreover, every day. In taste the Iveriya sausages are not inferior to the best German or Czech sausages. Gutusha Mikhaylovich developed their recipe.

"And now about Kartvelishvili the inventor. He proposed a new flow chart of the production of sausages. With a negligible expansion of the production areas he was able to double the output of products and at the same time to reduce the attendants by 10 people. All this became possible owing to the introduction of a wide range of inventions--Certificates of Authorship Nos 824 502, 906 487, 938 886, 1 001 907, and others. Gutusha Mikhaylovich proposed an advanced continuous rotary technology: the cooking, browning and, if necessary, smoking of items are carried out in sequence in a circular unit, which received the name 'carousel.' In all 250,000 rubles were spent on the construction and installation of the 'carousel," which ensured in the end an increase of the output of products by 10 tons a day. This is about one-tenth the average indicator in our sector: according to the norms 220,000 rubles are spend on the additional output of 1 ton of products. Here it is, the visible impact of renovation!

"We decided to help the inventor, having given him an experienced engineer and two or three worker-specialists as assistants. Now it is possible to expect a large return from the creative brigade of Kartvelishvili. I believe that problems of a sectorial scale and specific license studies are within its powers. Incidentally, foreign meat processing firms have already shown an interest in the automatic sausage meat machines of Kartvelishvili, which are more productive than American machines and are simpler than them in production and maintenance."

Recorded by Yu. Yegorov

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AWARDS AND PRIZES

BRIEFS

LOW-TEMPERATURE TUMOR TREATMENT--A group of Soviet and Polish scientists developed a unique method and equipment, which make it possible to use low temperatures for attacking malignant tumors. The 1985 USSR State Prize was awarded to them for it. In the photograph [photo not reproduced]: members of the collective of authors and staff members of the All-Union Cancer Research Center--Doctors of Medical Sciences V. Shental and A. Paches. Photograph of M. Klimov. [Text] [Moscow TRUD in Russian 24 Dec 85 p 2] 7807

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